As filed with the Securities and Exchange Commission on March 18, 2019

Registration No. 333-230034

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

Amendment No. 2
to
FORM S-1

REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

Precision BioSciences, Inc.

(Exact name of registrant as specified in its charter)

Delaware	2836	20-4206017
(State or other jurisdiction of incorporation or organization)	(Primary Standard Industrial Classification Code Number)	(I.R.S. Employer Identification Number)

302 East Pettigrew St., Suite A-100
Durham, North Carolina 27701
(919) 314-5512
(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Matthew Kane
President and Chief Executive Officer
Precision BioSciences, Inc.
302 East Pettigrew St., Suite A-100
Durham, North Carolina 27701
(919) 314-5512
(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copies to:

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Approximate date of commencement of proposed sale to the public:
As soon as practicable after this Registration Statement is declared effective.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933 check the following box: ☐

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	☐	Accelerated filer	☐
Non-accelerated filer	☒	Smaller reporting company	☒
		Emerging growth company	☒

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of the Securities Act ☐

CALCULATION OF REGISTRATION FEE

Title of each class of securities to be registered	Amount to be registered(1)	Proposed maximum offering price per share	Proposed maximum aggregate offering price(2)	Amount of registration fee(3)
Common Stock, $0.000005 par value per share	9,085,000	$17.00	$154,445,000	$18,718.74

(1) Estimated solely for the purpose of calculating the registration fee in accordance with Rule 457(a) under the Securities Act of 1933, as amended. Includes 1,185,000 shares that the underwriters have an option to purchase.

(2) Includes the aggregate offering price of additional shares that the underwriters have an option to purchase.

(3) $12,120 of this registration fee was previously paid by the Registrant in connection with the filing of its Registration Statement on Form S-1 on March 1, 2019.

The registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the registrant shall file a further amendment that specifically states that this registration statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933, as amended, or until the registration statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), may determine.

The information in this preliminary prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This preliminary prospectus is not an offer to sell these securities and is not soliciting an offer to buy these securities in any state where the offer or sale is not permitted.

Subject to Completion, dated March 18, 2019

Preliminary prospectus

7,900,000 shares

Common stock

This is an initial public offering of shares of common stock by Precision BioSciences, Inc. We are offering 7,900,000 shares of our common stock. The initial public offering price is expected to be between $15.00 and $17.00 per share.

Prior to this offering, there has been no public market for our common stock. We have applied to list our common stock on The Nasdaq Global Market under the symbol “DTIL.”

We are an “emerging growth company” under the federal securities laws and are subject to reduced public company reporting requirements for this prospectus and future filings.

	Per share	Total
Initial public offering price	$	$
Underwriting discounts and commissions(1)	$	$
Proceeds to Precision BioSciences, Inc., before expenses	$	$

(1) See “Underwriting” for a description of compensation payable to the underwriters.

We have granted the underwriters an option for a period of 30 days to purchase up to 1,185,000 additional shares of our common stock.

Investing in our common stock involves a high degree of risk. See “Risk factors” beginning on page 12 of this prospectus.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed upon the adequacy or accuracy of this prospectus. Any representation to the contrary is a criminal offense.

The underwriters expect to deliver the shares of commons stock to purchasers on or about , 2019.

J.P. Morgan **Goldman Sachs & Co. LLC** **Jefferies** **Barclays**

, 2019.

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Neither we nor the underwriters have authorized anyone to provide any information or to make any representations other than those contained in this prospectus or in any free writing prospectus prepared by or on behalf of us or to which we have referred you. We take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. This prospectus is an offer to sell only the shares offered hereby, but only under circumstances and in jurisdictions where it is lawful to do so. The information contained in this prospectus or in any applicable free writing prospectus is current only as of its date, regardless of its time of delivery or any sale of shares of our common stock. Our business, financial condition, results of operations and prospects may have changed since that date.

Through and including , 2019 (the 25th day after the date of this prospectus), all dealers that effect transactions in these securities, whether or not participating in this offering, may be required to deliver a prospectus. This is in addition to the dealers' obligation to deliver a prospectus when acting as underwriters and with respect to their unsold allotments or subscriptions.

We have proprietary rights to trademarks, trade names and service marks appearing in this prospectus that are important to our business. Solely for convenience, the trademarks, trade names and service marks may appear in this prospectus without the ® and ™ symbols, but any such references are not intended to indicate, in any way, that we forgo or will not assert, to the fullest extent under applicable law, our rights or the rights of the applicable licensors to these trademarks, trade names and service marks. All trademarks, trade names and service marks appearing in this prospectus are the property of their respective owners.

For investors outside the United States: Neither we nor the underwriters have done anything that would permit this offering or possession or distribution of this prospectus in any jurisdiction where action for that purpose is required, other than in the United States. Persons outside the United States who come into possession of this prospectus must inform themselves about, and observe any restrictions relating to, the offering of the shares of common stock and the distribution of this prospectus outside the United States.

Prospectus summary

This summary highlights selected information contained in greater detail elsewhere in this prospectus. This summary does not contain all of the information you should consider before investing in our common stock. You should read this entire prospectus carefully, especially the risks of investing in our common stock discussed under "Risk factors" and our financial statements and the related notes thereto included at the end of this prospectus, before making an investment decision. As used in this prospectus, unless the context otherwise requires, references to "we," "us," "our," "the Company" and "Precision" refer to Precision BioSciences, Inc. and its subsidiaries on a consolidated basis.

Overview

We are a genome editing company dedicated to improving life through our groundbreaking proprietary genome editing platform, "ARCUS." We leverage ARCUS in the development of our product candidates, which are designed to treat human diseases and create healthy and sustainable food and agricultural solutions. We believe the versatility and breadth of ARCUS support our ability to develop products across the spectrum of biotechnology. We are actively developing product candidates in three innovative and high value areas where we believe our technology has the potential to overcome the limitations of other genome editing technologies: allogeneic CAR T immunotherapy, *in vivo* gene correction, and food. The U.S. Food and Drug Administration, or FDA, recently accepted our investigational new drug, or IND, application for our first gene-edited allogeneic CAR T cell candidate targeting CD19. We are currently screening patients for our planned Phase 1/2a clinical trial in patients with relapsed or refractory, or R/R, B-cell precursor acute lymphoblastic leukemia and R/R non-hodgkin lymphoma and expect to dose our first patient in this trial in April 2019. We believe this trial will be the first clinical investigation of an allogeneic CAR T therapy for non-hodgkin lymphoma. We believe our proprietary, one-step engineering process for producing allogeneic CAR T cells at large scale in a cost-effective manner will enable us to overcome the fundamental challenges of manufacturing that have limited the CAR T field to date.

Our genome editing platform

Genome editing is a biotechnology process that removes, inserts or repairs a portion of DNA at a specific location in a cell's genome. Our proprietary genome editing platform, ARCUS, is a novel genome editing technology using sequence-specific DNA-cutting enzymes, or nucleases, that is designed to perform modifications in the DNA of living cells and organisms.

ARCUS is not a CRISPR/Cas9 technology. ARCUS is a collection of protein engineering methods that we developed specifically to re-program the DNA recognition properties of the natural genome editing enzyme, I-CreI. In nature, I-CreI is an endonuclease found in the genome of the algae *Chlamydomonas reinhardtii*, which evolved for the purpose of carrying out a complex gene insertion edit.

To apply I-CreI to genome editing in other cells or organisms, we must modify it to recognize and cut a different DNA sequence for each new application we pursue. Since the I-CreI endonuclease evolved to recognize its target sequence in the algae genome with a high degree of selectivity, as supported by scientific literature, it was necessary for us to develop sophisticated protein engineering methods to re-engineer I-CreI to bind and cut a different DNA sequence. Using ARCUS, we create customized endonucleases for particular applications. We call these custom endonucleases "ARCUS nucleases."

We believe ARCUS has a number of attributes that are beneficial for genome editing applications, such as:

- **High Specificity**. Complex genome editing applications, especially those involving the human body, require a high level of endonuclease specificity to limit the likelihood that the endonuclease will recognize and edit any genetic sequence other than its intended target.
- **High Efficiency**. In our preclinical studies conducted to date, ARCUS has shown the ability to achieve a high level of on-target editing while rarely cutting off-target.
- **Easy Delivery**. ARCUS is very small relative to other genome editing endonucleases. As such, we believe it will be compatible with many different delivery mechanisms.
- **Type of cut**. The three prime, or 3', overhangs created when ARCUS cuts DNA have been observed to promote DNA repair through a mechanism called “homology directed repair,” or HDR. 3' overhangs are stretches of unpaired nucleotides in the end of a DNA molecule. We believe this adds significant versatility to ARCUS and will enable us to efficiently insert or repair DNA as well as delete DNA.
- **Programmability**. ARCUS has been observed in our preclinical studies to recognize its DNA target site through a complex network of interactions that is challenging to re-program for new editing applications involving different DNA sequences. This engineering challenge represents a high barrier to entry and has enabled us to secure a strong intellectual property position and control over what we believe to be a superior genome editing technology.

Our product pipeline

We are leveraging ARCUS to develop product candidates in three high value areas: allogeneic CAR T immunotherapy, *in vivo* gene correction and food. In each area, we have surrounded ARCUS with ancillary technologies and manufacturing capabilities specific to that field. This enables us to advance three independent pipelines with separate and distinct opportunity and risk profiles.

Allogeneic CAR T immunotherapy. We believe that we have developed a transformative allogeneic chimeric antigen receptor, or CAR, T immunotherapy platform with the potential to overcome certain limitations of autologous CAR T cell therapies and significantly increase patient access to these cutting-edge treatments. Cancer immunotherapy is a type of cancer treatment that uses the body's immune system to fight the disease. CAR T is a form of immunotherapy in which a specific type of immune cell, called a "T cell," is genetically engineered to recognize and kill cancer cells. Current commercially available CAR T therapies are autologous, meaning the T cells used as the starting material for this engineering process are derived directly from the patient. As a consequence, the therapy is highly personalized, difficult to scale and expensive. Our allogeneic approach uses donor-derived T cells that are gene edited using ARCUS and are designed for safe delivery to an unrelated patient. We believe that this donor-derived approach will lessen the product-to-product variability seen in autologous therapies and will allow us to consistently produce a potent product by selecting donors with high quality T cells. We are able to produce allogeneic CAR T cells at large scale in a cost-effective manner and have the potential to overcome the "one patient: one product" burden of autologous CAR T cell therapies.

In February 2016, we entered into a development and commercial license agreement, as amended, with Baxalta (now Shire Plc), which we refer to as the Servier Agreement. This agreement was assigned to Les Laboratoires Servier, or Servier, in connection with Servier's acquisition of Shire's oncology business in August 2018. Pursuant to this agreement we have agreed to perform early-stage research and development on individual T cell modifications for up to six unique antigen targets, the first of which was selected by Baxalta at the inception of the agreement and the remaining five of which may be selected by Servier over the first four years of the agreement. Upon selection of an antigen target, we have agreed to develop the resulting therapeutic product candidates through Phase 1 clinical trials and prepare the clinical supply of such product candidates for use in Phase 2 clinical trials. Our most advanced program, PBCAR0191, is an allogeneic CAR T cell therapy targeting the well-validated tumor target CD19 and is being developed for acute lymphoblastic leukemia, or ALL, and non-hodgkin lymphoma, or NHL. CD19 is a protein that is expressed on the surface of B cells. Our IND for PBCAR0191 was accepted by the FDA in November 2018. We are currently screening patients for our planned Phase 1/2a clinical trial in patients with R/R B-cell precursor ALL and R/R NHL and expect to dose our first patient in this trial in April 2019. We expect to report interim data results from this trial in early 2020. The FDA has granted PBCAR0191 orphan drug designation for the treatment of ALL. We are also in preclinical development of CAR T cell therapies targeting the tumor antigens CD20, BCMA and CLL-1. We expect to submit an IND to the FDA for our CD20 product candidate in the fourth quarter of 2019 and for each of our BCMA product candidate and our CLL-1 product candidate in 2020.

We have used the qualities of ARCUS to develop a one-step cell engineering process for allogeneic CAR T cells that is designed to rapidly yield a consistent cell product at a significantly lower cost than autologous CAR T cell therapies. Due to our one-step editing method and the decision early in the development of our allogeneic CAR T immunotherapy platform to invest in process development, we have scaled our manufacturing process and are currently producing allogeneic CAR T cells at large scale in accordance with good manufacturing practice, or GMP.

***In vivo* gene correction.** Our goal is to cure genetic diseases by correcting the DNA errors responsible for causing them. *In vivo* gene corrections are gene corrections that take place in a living organism. We are advancing a deep portfolio of diverse programs toward *in vivo* efficacy and toxicity studies. We are generating a

significant large animal dataset that we believe will be the most comprehensive of any in the field and have observed high-efficiency *in vivo* genome editing in non-human primates in our preclinical studies, as highlighted in our July 2018 publication in *Nature Biotechnology*. We believe this is the first peer-reviewed publication of *in vivo* genome editing data in non-human primates. In our preclinical studies, we observed the high-efficiency editing of the PCSK9 gene in non-human primates using ARCUS and, even at the highest dose, the treatment was observed to be well-tolerated. We have continued to observe the subjects for over two years since initial dosing and the benefit of the treatment in these studies appears to be permanent, which we believe is due to modifications to the DNA itself.

In September 2018, we announced a collaboration with Gilead Sciences, Inc. to co-develop an ARCUS-based product candidate that is designed to cure chronic Hepatitis B infection. We intend to submit an IND to the FDA in 2020 for this product candidate. We are also in the discovery stage for other *in vivo* indications: familial amyloid polyneuropathy, primary hyperoxaluria, hemophilia A, retinitis pigmentosa, lipoprotein lipase deficiency and familial hypercholesterolemia. We intend to select an indication and target for our next *in vivo* product candidate in the first half of 2019.

Food. Our food platform, which we operate through our wholly owned subsidiary, Elo Life Systems, or Elo, is an integrated suite of gene discovery and crop engineering technologies that is designed to generate pre-breeding materials in collaboration with leading food producers. Pre-breeding material is a gene edited crop intermediate that the collaborating partner can integrate into their breeding program and use in producing new crop varieties. We believe we have the most in-depth experience in crop genome editing in the industry. Over the last decade, we have worked with some of the largest plant biotechnology companies to edit gene targets and develop potential product candidates in a variety of crop plants. By combining the power of our ARCUS technology platform with target discovery, transformation and high throughput trait evaluation, we are enabling our partners to potentially address critical issues in food and agriculture created by climate change and dramatic shifts in consumer preference toward healthier eating. Our collaboration-based business model enables us to remain capital efficient throughout the product development cycle while generating revenue through various revenue-sharing models. For example, since 2014, Elo and Cargill have been engaged in a collaboration to produce ARCUS-optimized canola varieties and have achieved significantly lower levels (less than 4.5%) of saturated fatty acids compared to the current levels (7%) in greenhouse studies. Prior to commercialization of any of our food product candidates, we must complete greenhouse studies and three phases of field testing.

Our strategy

Our goal is to broadly translate the potential of genome editing into permanent genetic solutions for significant unmet needs. Our strategy to achieve this goal includes the following key elements:

- Create a fully integrated genome editing company capable of delivering solutions that address unmet needs impacting human health.
- Accelerate advancement of our first four allogeneic CAR T immunotherapy product candidates while investing in the research and development of additional allogeneic CAR T programs.
- Advance *in vivo* genetic correction programs into human clinical trials.
- Build a food business focused on developing products designed to improve human health and respond to the impacts of climate change.

- Continue investing in the optimization of ARCUS and enabling technologies.
- Create an environment that is a destination of choice for premier talent within the life sciences industry.
- Expand the breadth of our operations through additional product platforms and strategic relationships.

Sources of capital

To date, we have generated approximately $317 million from third parties through a combination of preferred stock and convertible note financings, an upfront payment under the Servier Agreement and additional funding from other strategic alliances and grants. Across our preferred stock financings, we received investments from venBio, F-Prime, ArrowMark Partners, Franklin Templeton, Cowen Healthcare, Gilead, Brace Pharma, Portfax AgTech, OCV Partners, Adage Capital, RA Capital, Amgen Ventures, Vivo and Ridgeback Capital, among others.

In March 2019, we sold and issued approximately $39.6 million aggregate principal amount of convertible promissory notes, or the 2019 Notes, in a private placement transaction. The 2019 Notes accrue interest at a rate of 6% per annum and will automatically settle into shares of our common stock in connection with the closing of this offering at a settlement price equal to the lesser of (1) 85% of the initial public offering price per share set forth on the cover page of this prospectus or (2) a price per share equal to $800.0 million divided by our fully diluted capitalization as of immediately prior to the closing of this offering.

Risks associated with our business

Our business is subject to a number of risks that you should be aware of before making an investment decision. You should carefully consider all of the information set forth in this prospectus and, in particular, should evaluate the specific factors set forth under “Risk factors” in deciding whether to invest in our common stock. Among these important risks are the following:

- We have incurred significant operating losses since our inception and expect to continue to incur losses for the foreseeable future. We have never been profitable, and may never achieve or maintain profitability.
- We will need substantial additional funding, and if we are unable to raise a sufficient amount of capital when needed on acceptable terms, or at all, we may be forced to delay, reduce or eliminate some or all of our research programs, product development activities and commercialization efforts.
- We have a limited operating history, which makes it difficult to evaluate our current business and future prospects and may increase the risk of your investment.
- ARCUS is a novel technology, making it difficult to predict the time, cost and potential success of product candidate development. We have not yet been able to assess the safety and efficacy of any product candidates in humans.
- The regulatory landscape that will apply to development of therapeutic product candidates by us or our collaborators is rigorous, complex, uncertain and subject to change, which could result in delays or termination of development of such product candidates or unexpected costs in obtaining regulatory approvals.
- Adverse public perception of genome editing may negatively impact the developmental progress or commercial success of potential products.

- Our research and development programs may not lead to the successful identification, development or commercialization of any potential products.
- Positive results, if any, obtained from early preclinical studies or clinical trials of our product candidates may not be predictive of results of later studies or trials, and failure to replicate positive results from early studies or clinical trials may inhibit our ability to further develop and commercialize product candidates.
- Clinical trials are difficult to design and implement, expensive, time-consuming and involve an uncertain outcome, and the inability to obtain regulatory approval for product candidates would substantially harm our business.
- If any of our product candidates do not work as intended or cause undesirable side effects, it could hinder or prevent receipt of regulatory approval or realization of commercial potential for them or our other product candidates and could substantially harm our business.
- Delays in completing our planned manufacturing facility or failure to achieve operating efficiencies from it may require us to devote additional resources and management time to manufacturing operations and may delay our product development timelines.
- Our ability to compete may decline if we do not adequately protect our proprietary rights, and our proprietary rights do not necessarily address all potential threats to our competitive advantage.
- Third parties may assert claims against us alleging infringement of their patents and proprietary rights, or we may need to become involved in lawsuits to defend or enforce our patents, either of which could prohibit our use of proprietary technology or sale of potential products or put our patents and other proprietary rights at risk.

Implications of being an emerging growth company

We are an “emerging growth company,” as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act. We will remain an emerging growth company until the earlier of (1) the last day of the fiscal year in which we have total annual gross revenue of $1.07 billion or more, (2) the last day of the fiscal year following the fifth anniversary of the date of the completion of this offering, (3) the date on which we have issued more than $1.0 billion in nonconvertible debt during the previous three years or (4) the date on which we are deemed to be a large accelerated filer under the rules of the Securities and Exchange Commission, or the SEC, which means the market value of our common stock that is held by non-affiliates exceeds $700 million as of the prior June 30th. For so long as we remain an emerging growth company, we are permitted and intend to rely on exemptions from certain disclosure requirements that are applicable to other public companies that are not emerging growth companies. These exemptions include:

- being permitted to present only two years of audited financial statements and only two years of related “Management’s discussion and analysis of financial condition and results of operations” in this prospectus;
- not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, as amended;
- not being required to comply with any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation or a supplement to the auditor’s report providing additional information about the audit and the financial statements;

- reduced disclosure obligations regarding executive compensation in this prospectus and our periodic reports, proxy statements and registration statements; and
- exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved.

We have taken advantage of reduced reporting burdens in this prospectus and may elect to take advantage of other reduced reporting requirements in future filings. In particular, in this prospectus, we have provided only two years of audited financial statements and corresponding "Management's discussion and analysis of financial condition and results of operations" disclosure and have not included all of the executive compensation related information that would be required if we were not an emerging growth company.

In addition, the JOBS Act provides that an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards. This provision of the JOBS Act allows an emerging growth company to delay the adoption of these accounting standards until they would otherwise apply to private companies. We have elected to take advantage of this extended transition period.

Even after we no longer qualify as an emerging growth company, we may still qualify as a "smaller reporting company," which would allow us to take advantage of many of the same exemptions from disclosure requirements including reduced disclosure obligations regarding executive compensation in this prospectus and our periodic reports and proxy statements.

Corporate information

We were incorporated in Delaware in January 2006. Our principal executive offices are located at 302 East Pettigrew St., Suite A-100, Durham, North Carolina 27701, and our telephone number is (919) 314-5512. Our website address is www.precisionbiosciences.com. The information contained in, or accessible through, our website does not constitute a part of this prospectus.

The offering

Common stock offered by us	7,900,000 shares
Common stock to be outstanding immediately after this offering	49,030,259 shares (or 50,215,259 shares if the underwriters exercise their option to purchase additional shares in full).
Option to purchase additional shares	We have granted the underwriters a 30-day option to purchase up to 1,185,000 additional shares of our common stock at the public offering price less the underwriting discounts and commissions.
Use of proceeds	We estimate that the net proceeds from this offering will be approximately $113.3 million (or approximately $130.9 million if the underwriters exercise in full their option to purchase additional shares of common stock), at an assumed public offering price of $16.00 per share, after deducting estimated underwriting discounts and commissions and the estimated offering expenses payable by us. We anticipate that we will use the net proceeds of this offering to advance and expand our clinical and preclinical development programs, fund the build-out of our planned cGMP-compliant manufacturing facility and the remainder for ongoing research and development activities and working capital and other general corporate purposes. For a more complete description of our intended use of the proceeds from this offering, see “Use of proceeds.”
Risk factors	You should carefully read the “Risk factors” beginning on page 11 and the other information included in this prospectus for a discussion of factors you should consider carefully before deciding to invest in our common stock.
Proposed Nasdaq Global Market symbol	“DTIL”

The number of shares of our common stock to be outstanding after this offering is based on 15,906,645 shares of our common stock outstanding as of December 31, 2018, and excludes:

- 7,763,464 shares of common stock issuable upon exercise of stock options outstanding under our 2006 Stock Incentive Plan, referred to as our 2006 Plan, and our 2015 Stock Incentive Plan, referred to as our 2015 Plan, in each case as of December 31, 2018, at a weighted-average exercise price of $5.00 per share;
- 4,750,000 shares of our common stock reserved for future issuance under our 2019 Incentive Award Plan, referred to as our 2019 Plan, which will become effective upon the effectiveness of the registration statement of which this prospectus forms a part, and from which we intend to grant options to purchase shares of our common stock having an aggregate value of $350,000 to one of our directors as more fully described in “Executive and Director Compensation—Director compensation—IPO grants to non-employee directors under the 2019 Plan,” which number does not include any automatic increases in the number of shares of our common stock reserved for future issuance under our 2019 Plan; and

- 525,000 shares of our common stock reserved for future issuance under our 2019 Employee Stock Purchase Plan, referred to as our 2019 ESPP, which will become effective upon the effectiveness of the registration statement of which this prospectus forms a part, which number does not include any automatic increases in the number of shares of our common stock reserved for future issuance under our 2019 ESPP.

Unless otherwise indicated, this prospectus reflects and assumes the following:

- a 1 -for- 2.134686 reverse stock split of our common stock effected on March 15, 2019;
- the automatic conversion of all outstanding shares of our convertible preferred stock outstanding into an aggregate of 22,301,190 shares of our common stock upon the closing of this offering;
- the issuance of 2,922,424 shares of common stock upon the automatic settlement of the 2019 Notes, including accrued interest, assuming an initial public offering price per share of $16.00, which is the midpoint of the price range set forth on the cover page of this prospectus, in connection with the closing of this offering;
- no exercise of outstanding options after December 31, 2018;
- the filing of our amended and restated certificate of incorporation, which will occur upon the closing of this offering; and
- no exercise by the underwriters of their option to purchase additional shares of our common stock.

Summary consolidated financial data

The following tables present a summary of our historical financial data for the periods ended on and as of the dates indicated. We have derived the summary consolidated statements of operations data for the years ended December 31, 2017 and 2018 and summary consolidated balance sheet data as of December 31, 2018 from our audited consolidated financial statements included elsewhere in this prospectus. Our historical results are not necessarily indicative of the results that should be expected for any future period. You should read the following summary consolidated financial data together with the more detailed information contained in "Selected consolidated financial data," "Management's discussion and analysis of financial condition and results of operations" and our consolidated financial statements and the related notes included elsewhere in this prospectus.

	Years ended December 31,	
(in thousands, except share and per share data)	**2017**	**2018**
Consolidated Statements of Operations Data:		
Revenue	$ 6,484	$ 10,883
Operating expenses:		
Research and development	20,324	45,122
General and administrative	8,016	13,673
Impairment of intangible assets	118	—
Total operating expenses	28,458	58,795
Loss from operations	(21,974)	(47,912)
Other income:		
Interest income	872	1,875
Net loss and net loss attributable to common stockholders—basic and diluted	$ (21,102)	$ (46,037)
Net loss per share attributable to common stockholders—basic and diluted	$ (1.33)	$ (2.92)
Weighted-average shares of common stock outstanding—basic and diluted(1)	15,906,793	15,775,541
Pro forma net loss per share attributable to common stockholders—basic and diluted (unaudited)(1)		$ (1.37)
Pro forma weighted-average shares of common stock outstanding—basic and diluted (unaudited)(1)		33,653,835

(1) See Note 10 to our audited consolidated financial statements included elsewhere in this prospectus for an explanation of the method used to calculate the historical and pro forma basic and diluted net loss per share of common stock and the weighted-average number of shares used in the computation of the per share amounts.

	As of December 31, 2018		
(in thousands)	**Actual**	**Pro forma(1)**	**Pro forma as adjusted(2)**
Consolidated Balance Sheet Data:			
Cash and cash equivalents	$103,193	$ 142,743	$ 256,037
Working capital(3)	101,600	141,150	254,443
Total assets	138,600	178,150	291,443
Total liabilities	98,640	98,640	98,640
Accumulated deficit	(85,187)	(92,396)	(92,396)
Stockholders' equity	39,960	79,505	192,798

(1) The pro forma consolidated balance sheet data gives effect to the automatic conversion of all outstanding shares of our convertible preferred stock into an aggregate of 22,301,190 shares of common stock, which will occur upon the closing of this offering, the receipt of $39.6 million in cash proceeds from the sale of the 2019 Notes in March 2019 and the automatic settlement of the 2019 Notes, including accrued interest, into 2,922,424 shares of our common stock in connection with the closing of this offering, and an aggregate charge to accumulated deficit of $7.2 million relating to the loss resulting from the change in fair value of the 2019 Notes from the issuance date through their settlement, assuming an initial public offering price per share of $16.00, which is the midpoint of the price range set forth on the cover page of this prospectus.

(2) Reflects the pro forma adjustments described in footnote (1) and the issuance and sale of 7,900,000 shares of common stock in this offering at an assumed initial public offering price of $16.00 per share, which is the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

(3) We define working capital as current assets less current liabilities. See our consolidated financial statements included elsewhere in this prospectus for further details regarding our current assets and current liabilities.

Each $1.00 increase (decrease) in the assumed initial public offering price of $16.00 per share, which is the midpoint of the price range set forth on the cover page of this prospectus, would increase (decrease) the pro forma as adjusted amount of each of cash and cash equivalents, working capital, total assets, and stockholders' equity by $7.3 million, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions. Similarly, each increase (decrease) of 1.0 million shares in the number of shares offered by us at the assumed initial public offering price would increase (decrease) each of cash and cash equivalents, working capital, total assets, and stockholders' equity by $14.9 million, assuming the assumed initial public offering price per share remains the same and after deducting estimated underwriting discounts and commissions. The pro forma information discussed above is illustrative only and will be adjusted based on the actual initial public offering price and other terms of our initial public offering determined at pricing.

Risk factors

Investing in our common stock involves a high degree of risk. Before investing in our common stock, you should consider carefully the risks described below, together with the other information contained in this prospectus, including our consolidated financial statements and the related notes appearing herein. The occurrence of any of the following risks could materially adversely affect our business, financial condition, results of operations and prospects. In these circumstances, the market price of our common stock could decline, and you may lose all or part of your investment.

Risks related to our financial condition, limited operating history and need for additional capital

We have incurred significant operating losses since our inception and expect to continue to incur losses for the foreseeable future. We have never been profitable, and may never achieve or maintain profitability.

We have never been profitable and do not expect to be profitable in the foreseeable future. Since inception, we have incurred significant operating losses. If our product candidates are not successfully developed and approved, we may never generate any revenue from product sales. Our net losses were $46.0 million for the year ended December 31, 2018. As of December 31, 2018, we had an accumulated deficit of $85.2 million. In addition, we have not commercialized any products and have never generated any revenue from product sales. Substantially all of our losses have resulted from expenses incurred in connection with our research and development activities, including our preclinical development activities, and from general and administrative costs associated with our operations. We have financed our operations primarily through private placements of our convertible preferred stock and our development and commercial license agreement dated February 24, 2016, as amended, with Les Laboratoires Servier, which we refer to as the Servier Agreement. The amount of our future net losses will depend, in part, on the amount and growth rate of our expenses and our ability to generate revenues.

All of our current or future product candidates will require substantial additional development time and resources before we may realize revenue from product sales, if at all. We expect to continue to incur significant expenses and operating losses for the foreseeable future. We anticipate that our expenses will increase substantially if and as we:

- continue our current research and development programs, including conducting laboratory, preclinical and greenhouse studies for product candidates;
- initiate clinical or field trials for product candidates;
- seek to identify, assess, acquire or develop additional research programs or product candidates;
- maintain, expand and protect our intellectual property portfolio;
- seek marketing approvals for any product candidates that may successfully complete development;
- establish a sales, marketing and distribution infrastructure to commercialize any products that may obtain marketing approval;
- further develop and refine the manufacturing process for our product candidates;
- change or add additional manufacturers or suppliers of biological materials or product candidates;
- validate a commercial-scale manufacturing facility compliant with current Good Manufacturing Practices, or cGMP;

- further develop our genome editing technology;
- acquire or in-license other technologies;
- seek to attract and retain new and existing personnel;
- expand our facilities; and
- operate as a public company.

No clinical studies have begun on any of our therapeutic product candidates, and it will be several years, if ever, before we obtain regulatory approval for, and are ready for commercialization of, a therapeutic product candidate. Similarly, no product candidate from our food platform has advanced to field testing, and it will be several years, if ever, before we or our collaborators commercialize any such product candidate. New food and agriculture products using the precise breeding approach generally take approximately three to five years to develop. Even if a therapeutic product candidate receives regulatory approval or a food or agriculture product advances through commercialization, future revenues for such product candidate will depend upon many factors, such as, as applicable, the size of any markets in which such product candidate is approved for sale, the market share captured by such product candidate, including as a result of the market acceptance of such product candidate and the effectiveness of manufacturing, sales, marketing and distribution operations related to such product candidate, the terms of any collaboration or other strategic arrangement we may have with respect to such product candidate and levels of reimbursement from third-party payors. If we are unable to develop and commercialize one or more product candidates either alone or with collaborators, or if revenues from any product candidate that receives marketing approval or is commercialized are insufficient, we may not achieve profitability. Even if we do achieve profitability, we may not be able to sustain or increase profitability. If we are unable to achieve and maintain profitability, the value of our common stock will be materially adversely affected.

We will need substantial additional funding, and if we are unable to raise a sufficient amount of capital when needed on acceptable terms, or at all, we may be forced to delay, reduce or eliminate some or all of our research programs, product development activities and commercialization efforts.

The process of identifying product candidates and conducting preclinical or greenhouse studies and clinical or field trials is time consuming, expensive, uncertain and takes years to complete. We expect our expenses to increase in connection with our ongoing activities, particularly as we identify, continue the research and development of, initiate clinical or field trials of, and seek marketing approval for, product candidates. In addition, if any therapeutic product candidate that we develop alone or with collaborators obtains marketing approval, we may incur significant commercialization expenses related to product manufacturing, sales, marketing and distribution efforts. Furthermore, upon the closing of this offering, we expect to incur additional costs associated with operating as a public company. Accordingly, we will need to obtain substantial additional funding in connection with our continuing operations. If we are unable to raise sufficient capital when needed, we may be forced to delay, reduce or eliminate current or future research programs, product development activities and/or commercialization efforts.

We expect that our existing cash and cash equivalents, together with the net proceeds from this offering, will be sufficient to fund our expected operating expenses and capital expenditure requirements through 2020. We have based this estimate on assumptions that may prove to be wrong, and we could use our capital resources sooner than we currently expect. Our operating plans and other demands on our cash resources may change as a result of many factors, including factors unknown to us, and we may need to seek additional funds sooner than planned, through public or private equity or debt financings or other sources, such as strategic collaborations. We do not currently expect future grant revenues to be a material source of revenue.

Attempting to secure additional financing may divert our management from our day-to-day activities, which may adversely affect our ability to develop product candidates. Our future capital requirements will depend on many factors, including:

- the timing, scope, progress, costs, results and analysis of results of research activities, preclinical or greenhouse studies and clinical or field trials for any of our product candidates;
- the costs of future activities, including product manufacturing, sales, marketing and distribution activities for any product candidates that receive regulatory approval;
- the success of our existing collaborative relationships;
- the extent to which we exercise any development or commercialization rights under collaborative relationships;
- our ability to establish and maintain additional collaborative relationships on favorable terms, or at all;
- the extent to which we expand our operations and the timing of such expansion, including with respect to facilities, employees and product development platforms;
- the costs of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property and proprietary rights and defending intellectual property-related claims;
- the extent to which we acquire or in-license other technologies or product candidates;
- the extent to which we acquire or invest in other businesses;
- the costs of operating as a public company; and
- the amount of revenues, if any, received from commercial sales of any products that we develop alone or with collaborators that receive regulatory approval.

Even if we believe we have sufficient funds for our current or future operating plans, we may seek additional capital if market conditions are favorable or in light of specific strategic considerations. Adequate additional financing may not be available to us on acceptable terms, or at all. If we are unable to obtain sufficient funding on a timely basis or on favorable terms, we may be required to significantly delay, reduce or eliminate one or more of our research or product development programs and/or commercialization efforts. We may also be unable to expand our operations or otherwise capitalize on business opportunities as desired. Any of these events could materially adversely affect our financial condition and business prospects.

Raising additional capital may cause dilution to our stockholders, including purchasers of common stock in this offering, restrict our operations or require us to relinquish rights to our technologies or product candidates.

Until such time, if ever, as we can generate substantial product revenues, we expect to finance our cash needs through a combination of equity and/or debt financings and collaborations, licensing agreements or other strategic arrangements. To the extent that we raise additional capital through the sale of equity or convertible debt securities, your ownership interest will be diluted, and the terms of such securities may include liquidation or other preferences that adversely affect your rights as a common stockholder. To the extent that we raise additional capital through debt financing, it would result in increased fixed payment obligations and a portion of our operating cash flows, if any, being dedicated to the payment of principal and interest on such indebtedness. In addition, debt financing may involve agreements that include restrictive covenants that impose operating restrictions, such as restrictions on the incurrence of additional debt, the making of certain capital expenditures or the declaration of dividends. To the extent we raise additional capital through

arrangements with collaborators or otherwise, we may be required to relinquish some of our technologies, research programs, product development activities, product candidates and/or future revenue streams, license our technologies and/or product candidates on unfavorable terms or otherwise agree to terms unfavorable to us. Furthermore, any capital raising efforts may divert our management from their day-to-day activities, which may adversely affect our ability to advance research programs, product development activities or product candidates.

We have a limited operating history, which makes it difficult to evaluate our current business and future prospects and may increase the risk of your investment.

We are a genome editing company with a limited operating history. We formed our company in 2006 and spent the first nine years of our company's history developing and refining our core technology, and only during the past several years have we focused our efforts on advancing the development of product candidates. Investment in biopharmaceutical and agricultural biotechnology product development is a highly speculative endeavor. It entails substantial upfront capital expenditures, and there is significant risk that any product candidate will fail to demonstrate adequate efficacy or an acceptable safety profile, obtain any required regulatory approvals or become commercially viable. Our genome editing platform and the technologies we are using are new and unproven. We have not yet commenced human clinical trials for any of our product candidates, nor have we commenced field trials for any of our product candidates from our food platform. We have not yet demonstrated an ability to initiate or successfully complete any clinical or field trials, obtain any required marketing approvals, manufacture products, conduct sales, marketing and distribution activities, or arrange for a third party to do any of the foregoing on our behalf. Consequently, any predictions made about our future success or viability may not be as accurate as they could be if we had a history of successfully developing and commercializing products.

Additionally, we encounter risks and difficulties frequently experienced by new and growing companies in rapidly developing and changing industries, including challenges in forecasting accuracy, determining appropriate investments of our limited resources, gaining market acceptance of our technology, managing a complex regulatory landscape and developing new product candidates, which may make it more difficult to evaluate our likelihood of success. Our current operating model may require changes in order for us to adjust to these challenges or scale our operations efficiently. Our limited operating history, particularly in light of the rapidly evolving nature of the biopharmaceutical and agricultural biotechnology industries and the genome editing field, may make it difficult to evaluate our technology and business prospects or to predict our future performance. Additionally, due to the stage of our operations, we expect that our financial condition and operating results may fluctuate significantly from quarter to quarter as a result of many factors as we build our business, and you should not rely upon the results of any particular quarterly or annual period as indications of future operating performance.

We may expend our limited resources pursuing particular research programs or product candidates that may be less successful or profitable than other programs or product candidates.

Research programs to identify new product candidates and product development platforms require substantial technical, financial and human resources. We may focus our efforts and resources on potential programs, product candidates or product development platforms that ultimately prove to be unsuccessful. Any time, effort and financial resources we expend on identifying and researching new product candidates and product development platforms may divert our attention from, and adversely affect our ability to continue, development and commercialization of existing research programs, product candidates and product development platforms. Clinical trials or field trials, as applicable, of any of our product candidates may never commence despite the expenditure of significant resources in pursuit of their development, and our spending on current and future research and development programs, product candidates and product development

platforms may not yield any commercially viable products. As a result of having limited financial and managerial resources, we may forego or delay pursuit of opportunities that later prove to have greater commercial potential. Our resource allocation decisions may cause us to fail to timely capitalize on viable commercial products or profitable market opportunities. Additionally, if we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through collaboration, licensing or other strategic arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate.

We expect to take advantage of a Research and Development Tax Incentive program in Australia, which could be amended or changed.

We may be eligible to receive a financial incentive from the Australian government as part of its Research and Development Tax Incentive program, or R&D Tax Incentive program. The R&D Tax Incentive program is one of the key elements of the Australian government's support for Australia's innovation system and, if eligible, provides the recipient with a 43.5% refundable tax offset for research and development activities in Australia. There have been recent proposals to change the structure of the innovation and research and development funding landscape in Australia, which may impact the research and development tax incentive receivable for the 2018 financial year and beyond. There can be no assurance that we will qualify and be eligible for such incentives or that the Australian government will continue to provide incentives, offset, grants and rebates on similar terms or at all.

Risks related to the identification, development and commercialization of our product candidates

ARCUS is a novel technology, making it difficult to predict the time, cost and potential success of product candidate development. We have not yet been able to assess the safety and efficacy of any product candidates in humans.

Our success depends on our ability to develop and commercialize product candidates using our novel genome editing technology. The novel nature of our technology makes it difficult to accurately predict the developmental challenges we may face for product candidates as they proceed through research, preclinical or greenhouse studies and clinical or field trials. There have been a limited number of clinical trials of products created with genome editing technologies, none of which has utilized our technology, and no therapeutic product candidates created with other genome editing technologies have received marketing approval in the United States or Europe. Because our therapeutic research programs are all in research or preclinical stages, we have not yet been able to assess the safety or efficacy of any product candidates in humans. Current or future product candidates may not meet safety and efficacy requirements for continued development or ultimate approval in humans and may cause significant adverse events or toxicities. All of our product candidates are designed to act at the level of DNA, and because animal DNA differs from human DNA, it will be difficult for us to test our therapeutic product candidates in animal models for either safety or efficacy, and any testing that we conduct may not translate to their effects in humans. Moreover, animal models may not exist for some of the targets, diseases or indications that we intend to pursue. Similarly, we and our collaborators have not yet completed field trials for any agricultural product candidates created with our technology. Our product candidates may not be able to properly implement desired genetic edits with sufficient accuracy to be viable therapeutic or agricultural products, and there may be long-term effects associated with them that we cannot predict at this time. Any problems we experience related to the development of our genome editing technology or any of our or our collaborators' research programs or product candidates may cause significant delays or unanticipated costs, and we may not be able to satisfactorily solve such problems. These factors may prevent us

or our collaborators from completing our preclinical or greenhouse studies or any clinical or field trials that we or our collaborators may initiate, or profitably commercializing any product candidates on a timely basis, or at all. We may also experience delays in developing a sustainable, reproducible and scalable manufacturing process as we develop and prepare to commercialize product candidates. These factors make it more difficult for us to predict the time, cost and potential success of product candidate development. If our product development activities take longer or cost more than anticipated, or if they ultimately are not successful, it would materially adversely affect our business and results of operations.

The genome editing field is relatively new and evolving rapidly, and other existing or future technologies may provide significant advantages over our ARCUS platform, which could materially harm our business.

To date, we have focused our efforts on optimizing our proprietary genome editing technology and exploring its potential applications. ARCUS is a novel genome editing technology using sequence-specific DNA-cutting enzymes, or nucleases, that is designed to perform modifications in the DNA of living cells and organisms. Other companies have previously undertaken research and development of genome editing technologies using zinc finger nucleases, transcription activator-like effector nucleases, or TALENs, and clustered regularly interspaced short palindromic repeats associated protein-9 nuclease, or CRISPR/Cas9, although none has obtained marketing approval for a product candidate developed using such technologies. Other genome editing technologies, or other existing or future technologies, may lead to the development of treatments or products that may be considered better suited for use in human therapeutics or agriculture, which could reduce or eliminate our commercial opportunity.

We are heavily dependent on the successful development and translation of ARCUS, and due to the early stages of our product development operations, we cannot give any assurance that any product candidates will be successfully developed and commercialized.

We are at an early stage of development of the product candidates currently in our programs and are continuing to develop our ARCUS technology. To date, we have invested substantially all of our efforts and financial resources to develop ARCUS and advance our current product development programs, including conducting preclinical studies and other early research and development activities, and providing general and administrative support for these operations. Our future success is dependent on our ability to successfully develop and, where applicable, obtain regulatory approval for, including marketing approval for, and then successfully commercialize, product candidates, either alone or with collaborators. We have not yet developed and commercialized any product candidates, and we may not be able to do so, alone or with collaborators.

Our research and development programs may not lead to the successful identification, development or commercialization of any products.

The success of our business depends primarily upon our ability to identify, develop and commercialize products using our genome editing technology. With the exception of our CD19 product candidate, all current product candidates and product development programs are still in the discovery, preclinical or greenhouse stages. We may be unsuccessful in advancing those product candidates into clinical development or field trials or in identifying any developing additional product candidates. Our ability to identify and develop product candidates is subject to the numerous risks associated with preclinical and early stage biotechnology development activities, including that:

- the use of ARCUS may be ineffective in identifying additional product candidates;
- we may not be able to assemble sufficient resources to acquire or discover additional product candidates;
- we may not be able to enter into collaborative arrangements to facilitate development of product candidates;

- competitors may develop alternatives that render our product candidates obsolete or less attractive;
- our product candidates may be covered by third parties' patents or other exclusive rights;
- the regulatory pathway for a product candidate may be too complex, expensive or otherwise difficult to navigate successfully; or
- our product candidates may be shown to not be effective, have harmful side effects or otherwise pose risks not outweighed by such product candidate's benefits or have other characteristics that may make the products impractical to manufacture, unlikely to receive any required marketing approval, unlikely to generate sufficient market demand or otherwise not achieve profitable commercialization.

Even if we do commence clinical trials of product candidates and continue to identify new product candidates, such product candidates may never be approved. Failure to successfully identify and develop new product candidates and obtain regulatory approvals for our products would have a material adverse effect on our business and financial condition and could cause us to cease operations.

If our product candidates do not achieve projected development milestones or commercialization in the announced or expected timeframes, the further development or commercialization of such product candidates may be delayed, and our business will be harmed.

We sometimes estimate, or may in the future estimate, the timing of the accomplishment of various scientific, clinical, manufacturing, regulatory and other product development objectives. These milestones may include our expectations regarding the commencement or completion of scientific studies or clinical or field trials, the submission of regulatory filings, the receipt of marketing approval or the realization of other commercialization objectives. The achievement of many of these milestones may be outside of our control. All of these milestones are based on a variety of assumptions, including assumptions regarding capital resources, constraints and priorities, progress of and results from development activities and the receipt of key regulatory approvals or actions, any of which may cause the timing of achievement of the milestones to vary considerably from our estimates. If we or our collaborators fail to achieve announced milestones in the expected timeframes, the commercialization of the product candidates may be delayed, our credibility may be undermined, our business and results of operations may be harmed, and the trading price of our common stock may decline.

Adverse public perception of genome editing may negatively impact the developmental progress or commercial success of products that we develop alone or with collaborators.

The developmental and commercial success of our current product candidates, or any that we develop alone or with collaborators in the future, will depend in part on public acceptance of the use of genome editing technology for the prevention or treatment of human diseases or for application in food or agricultural products. Adverse public perception of applying genome editing technology for these purposes may negatively impact our ability to raise capital or enter into strategic agreements for the development of product candidates.

The commercial success of any food or agricultural products that we develop alone or with collaborators may be adversely affected by claims that biotechnology plant products are unsafe for consumption or use, pose risks of damage to the environment or create legal, social or ethical dilemmas. Additionally, the public may perceive any potential food or agricultural products created with ARCUS to constitute genetically modified organisms, or GMO, even if they do not constitute genetically modified organisms under relevant regulatory requirements, and may be unwilling to consume them because of negative opinions regarding consumption of genetically modified organisms. This may result in expenses, delays or other impediments to development programs in our food platform or the market acceptance and commercialization of any potential food or agricultural products.

Any therapeutic product candidates may involve editing the human genome. The commercial success of any such potential therapeutic products, if successfully developed and approved, may be adversely affected by

claims that genome editing is unsafe, unethical or immoral. This may lead to unfavorable public perception and the inability of any therapeutic product candidates to gain the acceptance of the public or the medical community. Unfavorable public perceptions may also adversely impact our or our collaborators' ability to enroll clinical trials for therapeutic product candidates. Moreover, success in commercializing any therapeutic product candidates that receive regulatory approval will depend upon physicians prescribing, and their patients being willing to receive, treatments that involve the use of such product candidates in lieu of, or in addition to, existing treatments with which they are already familiar and for which greater clinical data may be available. Publicity of any adverse events in, or unfavorable results of, preclinical studies or clinical trials for any current or future product candidates, or with respect to the studies or trials of our competitors or of academic researchers utilizing genome editing technologies, even if not ultimately attributable to our technology or product candidates, could negatively influence public opinion. Negative public perception about the use of genome editing technology in human therapeutics and food or agricultural products, whether related to our technology or a competitor's technology, could result in increased governmental regulation, delays in the development and commercialization of product candidates or decreased demand for the resulting products, any of which may have a negative impact on our business and financial condition.

Interim "top-line" and preliminary data from studies or trials that we announce or publish from time to time may change as more data become available and are subject to audit and verification procedures that could result in material changes in the final data.

From time to time, we may publish interim "top-line" or preliminary data from preclinical or greenhouse studies or clinical or field trials. Interim data are subject to the risk that one or more of the outcomes may materially change as more data become available. We also make assumptions, estimations, calculations and conclusions as part of our analyses of data, and we may not have received or had the opportunity to fully and carefully evaluate all data. As a result, the top-line results that we report may differ from future results of the same studies, or different conclusions or considerations may qualify such results, once additional data have been received and fully evaluated. Preliminary or "top-line" data also remain subject to audit and verification procedures that may result in the final data being materially different from the preliminary data we previously published. As a result, interim and preliminary data should be viewed with caution until the final data are available. Additionally, interim data from clinical trials that we may complete are subject to the risk that one or more of the clinical outcomes may materially change as patient enrollment continues and more patient data become available. Adverse differences between preliminary or interim data and final data could significantly harm our business prospects.

Further, others, including regulatory agencies, may not accept or agree with our assumptions, estimates, calculations, conclusions or analyses or may interpret or weigh the importance of data differently, which could impact the value of the particular program, the approvability or commercialization of the particular product candidate or product and our company in general. In addition, the information we choose to publicly disclose regarding a particular study or clinical trial is based on what is typically extensive information, and you or others may not agree with what we determine is the material or otherwise appropriate information to include in our disclosure. Any information we determine not to disclose may ultimately be deemed significant by you or others with respect to future decisions, conclusions, views, activities or otherwise regarding a particular product candidate or our business. If the top-line data that we report differ from actual results, or if others, including regulatory authorities, disagree with the conclusions reached, our ability to obtain approval for, and commercialize, product candidates may be harmed, which could significantly harm our business prospects.

We face significant competition in industries experiencing rapid technological change, and there is a possibility that our competitors may achieve regulatory approval before us or develop product candidates or treatments that are safer or more effective than ours, which may harm our financial condition and our ability to successfully market or commercialize any of our product candidates.

The development and commercialization of new drug products is highly competitive, and the genome editing field is characterized by rapidly changing technologies, significant competition and a strong emphasis on intellectual property. We will face competition with respect to our current and future therapeutic product candidates from major pharmaceutical companies, specialty pharmaceutical companies and biotechnology companies worldwide. Potential competitors also include academic institutions, government agencies and other public and private research organizations that conduct research, seek patent protection and establish collaborative arrangements for research, development, manufacturing and commercialization of products. Competition for improving plant genetics comes from conventional and advanced plant breeding techniques, as well as from the development of advanced biotechnology traits. Other potentially competitive sources of improvement in crop yields include improvements in crop protection chemicals, fertilizer formulations, farm mechanization, other biotechnology and information management. Programs to improve genetics and crop protection chemicals are generally concentrated within a relatively small number of large companies, while non-genetic approaches are underway with a broader set of companies.

There are a number of large pharmaceutical and biotechnology companies that currently market and sell products or are pursuing the development of products for the treatment of the disease indications for which we have research programs. Some of these competitive products and therapies are based on scientific approaches that are similar to our approach, and others are based on entirely different approaches. We principally compete with others developing and utilizing genome editing technology in the human health and plant sciences sectors, including companies such as Cellectis S.A., CRISPR Therapeutics, AG, Editas Medicine, Inc., Intellia Therapeutics, Inc. and Sangamo Therapeutics, Inc. Several companies, including Novartis Pharmaceuticals Corp. and Gilead Sciences, Inc., or Gilead, have obtained FDA approval for autologous immunotherapies, and a number of companies, including Cellectis S.A., Celgene Corp., Allogene Therapeutics and CRISPR Therapeutics AG, are pursuing allogeneic immunotherapies. We expect that our operations focused on developing products for *in vivo* gene correction will face substantial competition from others focusing on gene therapy treatments, especially those that may focus on conditions that our product candidates target. Moreover, any human therapeutics products that we develop alone or with collaborators will compete with existing standards of care for the diseases and conditions that our product candidates target and other types of treatments, such as small molecule, antibody or protein therapies. Our competitors in the agricultural biotechnology space include Pairwise Plants, LLC, Caribou Biosciences, Inc., Corteva Agriscience, Tropic Biosciences UK LTD, Calyxt, Inc. and Cibus.

Many of our current or potential competitors, either alone or with their collaborators, have significantly greater financial resources and expertise in research and development, manufacturing, preclinical or greenhouse testing, conducting clinical or field trials, obtaining regulatory approvals and marketing approved products than we do. Mergers and acquisitions in the pharmaceutical, biotechnology and agricultural biotechnology industries may result in even more resources being concentrated among a smaller number of our competitors. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies. These competitors also compete with us in recruiting and retaining qualified scientific and management personnel and establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs. Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize products that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than any products we develop alone or with collaborators or that would render

any such products obsolete or non-competitive. Our competitors also may obtain FDA or other regulatory approval for their products more rapidly than we or our collaborators may obtain approval for any that we develop, which could result in our competitors establishing a strong market position before we are able to enter the market. Additionally, technologies developed by our competitors may render our product candidates uneconomical or obsolete, and we or our collaborators may not be successful in marketing any product candidates we may develop against competitors. The availability of our competitors' products could limit the demand, and the price we are able to charge, for any products that we develop alone or with collaborators.

Our future profitability, if any, depends in part on our and our collaborators' ability to penetrate global markets, where we would be subject to additional regulatory burdens and other risks and uncertainties associated with international operations that could materially adversely affect our business.

Our future profitability, if any, will depend in part on our ability and the ability of our collaborators to commercialize any products that we or our collaborators may develop in markets throughout the world. Commercialization of products in various markets could subject us to risks and uncertainties, including:

- obtaining, on a country-by-country basis, the applicable marketing authorization from the competent regulatory authority;
- the burden of complying with complex and changing regulatory, tax, accounting, labor and other legal requirements in each jurisdiction that we or our collaborators pursue;
- reduced protection for intellectual property rights;
- differing medical and agricultural practices and customs affecting acceptance in the marketplace;
- import or export licensing requirements;
- governmental controls, trade restrictions or changes in tariffs;
- economic weakness, including inflation, or political instability in particular non-U.S. economies and markets;
- production shortages resulting from any events affecting raw material supply or manufacturing capabilities abroad;
- longer accounts receivable collection times;
- longer lead times for shipping;
- language barriers;
- foreign currency exchange rate fluctuations;
- foreign reimbursement, pricing and insurance regimes; and
- the interpretation of contractual provisions governed by foreign laws in the event of a contract dispute.

We have no prior experience in these areas, and our collaborators may have limited experience in these areas. Failure to successfully navigate these risks and uncertainties may limit or prevent market penetration for any products that we or our collaborators may develop, which would limit their commercial potential and our revenues.

Product liability lawsuits against us could cause us to incur substantial liabilities and could limit commercialization of any products that we develop alone or with collaborators.

We face an inherent risk of product liability and professional indemnity exposure related to the testing in clinical or field trials of our product candidates. We will face an even greater liability risk if we commercially sell any products that we or our collaborators may develop for human use or consumption. Manufacturing defects, errors in product distribution or storage processes, improper administration or application and known or unknown side effects of product usage may result in liability claims against us or third parties with which we have relationships. These actions could include claims resulting from acts by our collaborators, licensees and subcontractors over which we have little or no control.

For example, our liability could be sought by patients participating in clinical trials for potential therapeutic product candidates as a result of unexpected side effects, improper product administration or the deterioration of a patient's condition, patient injury or even death. Criminal or civil proceedings might be filed against us by patients, regulatory authorities, biopharmaceutical companies and any other third party using or marketing any product candidates or products that we develop alone or with collaborators. On occasion, large judgments have been awarded in class action lawsuits based on products that had unanticipated adverse effects. If we cannot successfully defend ourselves against claims that product candidates or products we develop alone or with collaborators caused harm, we could incur substantial liabilities.

Regardless of merit or eventual outcome, liability claims may result in:

- significant time and costs to defend the related litigation;
- injury to our reputation and significant negative media attention;
- diversion of management's attention from pursuing our strategy;
- withdrawal of clinical trial participants;
- delay or termination of clinical trials;
- decreased demand for any products that we develop alone or with collaborators;
- substantial monetary awards to trial participants or patients;
- product recalls, withdrawals or labeling, marketing or promotional restrictions;
- loss of revenue; and
- the inability to further develop or commercialize any products.

Although the clinical trial process is designed to identify and assess potential side effects, clinical development does not always fully characterize the safety and efficacy profile of a new medicine, and it is always possible that a drug or biologic, even after regulatory approval, may exhibit unforeseen side effects. If our product candidates were to cause adverse side effects during clinical trials or after approval, we may be exposed to substantial liabilities. Physicians and patients may not comply with any warnings that identify known potential adverse effects and patients who should not use our product candidates. If any of our product candidates are approved for commercial sale, we will be highly dependent upon consumer perceptions of us and the safety and quality of such products. We could be adversely affected if we are subject to negative publicity associated with illness or other adverse effects resulting from patients' use or misuse of such products or any similar products distributed by other companies.

Although we maintain product liability insurance coverage, it may not be adequate to cover all liabilities that we may incur. We anticipate that we will need to increase our insurance coverage when we begin clinical trials

and if we or our collaborators successfully commercialize any products. Insurance coverage is increasingly expensive. We may not be able to maintain insurance coverage at a reasonable cost or in an amount adequate to satisfy any liabilities to which we may become subject.

Additional risks related to the identification, development and commercialization of our therapeutic product candidates

The regulatory landscape that will apply to development of therapeutic product candidates by us or our collaborators is rigorous, complex, uncertain and subject to change, which could result in delays or termination of development of such product candidates or unexpected costs in obtaining regulatory approvals.

Regulatory requirements governing products created with genome editing technology or involving gene therapy treatment have changed frequently and will likely continue to change in the future. Approvals by one regulatory agency may not be indicative of what any other regulatory agency may require for approval, and there is substantial, and sometimes uncoordinated, overlap in those responsible for regulation of gene therapy products, cell therapy products and other products created with genome editing technology. For example, in addition to the submission of an investigational new drug application, or IND, to the FDA, before initiation of a clinical trial in the United States, certain human clinical trials for cell therapy products and gene therapy had historically been subject to review by the Recombinant DNA Advisory Committee, or the RAC, of the National Institutes of Health, or NIH, Office of Biotechnology Activities, or OBA, pursuant to the NIH Guidelines for Research Involving Recombinant DNA Molecules, or NIH Guidelines. Following an initial review, RAC members would make a recommendation as to whether the protocol raises important scientific, safety, medical, ethical or social issues that warrant in-depth discussion at the RAC's quarterly meetings. Even though the FDA decides whether individual cell therapy or gene therapy protocols may proceed under an IND, the RAC's recommendations were shared with the FDA and the RAC public review process, if undertaken, could delay the initiation of a clinical trial, even if the FDA had reviewed the trial design and details and has not objected to its initiation or has notified the sponsor that the study may begin. Conversely, the FDA can put an IND on clinical hold even if the RAC provided a favorable review or has recommended against an in-depth, public review.

On August 17, 2018, the NIH issued a notice in the Federal Register and issued a public statement proposing changes to the oversight framework for gene therapy trials, including changes to the applicable NIH Guidelines to modify the roles and responsibilities of the RAC with respect to human clinical trials of gene therapy products, and requesting public comment on its proposed modifications. During the public comment period, which closed October 16, 2018, the NIH has announced that it will no longer accept new human gene transfer protocols for review as part of the protocol registration process under the existing NIH Guidelines or convene the RAC to review individual clinical protocols. These trials will remain subject to the FDA's oversight and other clinical trial regulations, and oversight at the local level will continue as otherwise set forth in the NIH Guidelines. Specifically, under the NIH Guidelines, supervision of human gene transfer trials includes evaluation and assessment by an institutional biosafety committee, or IBC, a local institutional committee that reviews and oversees research utilizing recombinant or synthetic nucleic acid molecules at that institution. The IBC assesses the safety of the research and identifies any potential risk to public health or the environment, and such review may result in some delay before initiation of a clinical trial. While the NIH Guidelines are not mandatory unless the research in question is being conducted at or sponsored by institutions receiving NIH funding of recombinant or synthetic nucleic acid molecule research, many companies and other institutions not otherwise subject to the NIH Guidelines voluntarily follow them. Even though we may not be required to submit a protocol for our gene therapy product candidates through the NIH for RAC review, we will still be subject to significant regulatory oversight by the FDA, and in addition to the government regulators, the applicable IBC and institutional review board, or IRB, of each institution at which we or our collaborators conduct clinical trials of our product candidates, or a central IRB if appropriate, would need to review and approve the proposed clinical trial.

The same applies in the European Union, or the EU. The European Medicines Agency, or the EMA, has a Committee for Advanced Therapies, or CAT, that is responsible for assessing the quality, safety and efficacy of advanced-therapy medicinal products. Advanced-therapy medical products include gene therapy medicine, somatic-cell therapy medicines and tissue-engineered medicines. The role of the CAT is to prepare a draft opinion on an application for marketing authorization for a gene therapy medicinal candidate that is submitted to the EMA. In the EU, the development and evaluation of a gene therapy medicinal product must be considered in the context of the relevant EU guidelines. The EMA may issue new guidelines concerning the development and marketing authorization for gene therapy medicinal products and require that we comply with these new guidelines. Similarly complex regulatory environments exist in other jurisdictions in which we might consider seeking regulatory approvals for our product candidates, further complicating the regulatory landscape. As a result, the procedures and standards applied to gene therapy products and cell therapy products may be applied to any of our gene therapy or genome editing product candidates, but that remains uncertain at this point.

The clinical trial requirements of the FDA, the EMA and other regulatory authorities and the criteria these regulators use to evaluate the safety and efficacy of a product candidate vary substantially according to the type, complexity, novelty and intended use and market of the potential products. The regulatory approval process for product candidates created with novel genome editing technology such as ours can be more lengthy, rigorous and expensive than the process for other better known or more extensively studied product candidates and technologies. Since we are developing novel treatments for diseases in which there is little clinical experience with new endpoints and methodologies, there is heightened risk that the FDA, the EMA or comparable regulatory bodies may not consider the clinical trial endpoints to provide clinically meaningful results, and the resulting clinical data and results may be more difficult to analyze. This may be a particularly significant risk for many of the genetically defined diseases for which we may develop product candidates alone or with collaborators due to small patient populations for those diseases, and designing and executing a rigorous clinical trial with appropriate statistical power is more difficult than with diseases that have larger patient populations. Regulatory agencies administering existing or future regulations or legislation may not allow production and marketing of products utilizing genome editing technology in a timely manner or under technically or commercially feasible conditions. Even if our product candidates obtain required regulatory approvals, such approvals may later be withdrawn as a result of changes in regulations or the interpretation of regulations by applicable regulatory agencies.

Changes in applicable regulatory guidelines may lengthen the regulatory review process for our product candidates, require additional studies or trials, increase development costs, lead to changes in regulatory positions and interpretations, delay or prevent approval and commercialization of such product candidates, or lead to significant post-approval limitations or restrictions. Additionally, adverse developments in clinical trials conducted by others of gene therapy products or products created using genome editing technology, such as products developed through the application of a CRISPR/Cas9 technology, or adverse public perception of the field of genome editing, may cause the FDA, the EMA and other regulatory bodies to revise the requirements for approval of any product candidates we may develop or limit the use of products utilizing genome editing technologies, either of which could materially harm our business. Furthermore, regulatory action or private litigation could result in expenses, delays or other impediments to our research programs or the development or commercialization of current or future product candidates.

As we advance product candidates alone or with collaborators, we will be required to consult with these regulatory and advisory groups and comply with all applicable guidelines, rules and regulations. If we fail to do so, we or our collaborators may be required to delay or terminate development of such product candidates. Delay or failure to obtain, or unexpected costs in obtaining, the regulatory approval necessary to bring a product candidate to market could decrease our ability to generate sufficient product revenue to maintain our business.

The regulatory approval processes of the FDA and comparable foreign authorities are lengthy, time consuming and inherently unpredictable, and if we are ultimately unable to obtain regulatory approval for our product candidates, our business will be substantially harmed.

We and any collaborators are not permitted to commercialize, market, promote or sell any product candidate in the United States without obtaining marketing approval from the FDA. Foreign regulatory authorities, such as the EMA, impose similar requirements. The time required to obtain approval by the FDA, the EMA and comparable foreign authorities is unpredictable, but typically takes many years following the commencement of clinical trials and depends upon numerous factors, including substantial discretion of the regulatory authorities. In addition, approval policies, regulations or the type and amount of clinical data necessary to gain approval may change during the course of a product candidate's clinical development and may vary among jurisdictions. To date, we have not submitted a biologics license application, or BLA, or other marketing authorization application to the FDA or similar drug approval submissions to comparable foreign regulatory authorities for any product candidate. We and any collaborators must complete additional preclinical or nonclinical studies and clinical trials to demonstrate the safety and efficacy of our product candidates in humans to the satisfaction of the regulatory authorities before we will be able to obtain these approvals.

Our product candidates could fail to receive regulatory approval for many reasons, including the following:

- the FDA or comparable foreign regulatory authorities may disagree with the design or implementation of our or our collaborators' clinical trials;
- we or our collaborators may be unable to demonstrate to the satisfaction of the FDA or comparable foreign regulatory authorities that a product candidate is safe and effective for its proposed indication;
- the results of clinical trials may not meet the level of statistical significance required by the FDA or comparable foreign regulatory authorities for approval;
- we or our collaborators may be unable to demonstrate that a product candidate's clinical and other benefits outweigh its safety risks;
- the FDA or comparable foreign regulatory authorities may disagree with our or our collaborators' interpretation of data from preclinical studies or clinical trials;
- the data collected from clinical trials of product candidates may not be sufficient to support the submission of a BLA or other submission or to obtain regulatory approval in the United States or elsewhere;
- the FDA or comparable foreign regulatory authorities may fail to approve the manufacturing processes or facilities of third-party manufacturers with which we or our collaborators contract for clinical and commercial supplies;
- the FDA or comparable foreign regulatory authorities may fail to approve the companion diagnostics we contemplate developing with collaborators; and
- the approval policies or regulations of the FDA or comparable foreign regulatory authorities may significantly change in a manner rendering our or our collaborators' clinical data insufficient for approval.

This lengthy approval process as well as the unpredictability of future clinical trial results may result in our failing to obtain regulatory approval to market our product candidates, which would significantly harm our business, results of operations and prospects.

In addition, even if we were to obtain approval, regulatory authorities may approve any of our product candidates for fewer or more limited indications than we request, may impose significant limitations in the

form of narrow indications, warnings, or a Risk Evaluation and Mitigation Strategy, or REMS. Regulatory authorities may not approve the price we or our collaborators intend to charge for products we may develop, may grant approval contingent on the performance of costly post-marketing clinical trials, or may approve a product candidate with a label that does not include the labeling claims necessary or desirable for the successful commercialization of that product candidate. Any of the foregoing scenarios could materially harm the commercial prospects for our product candidates.

Clinical trials are difficult to design and implement, expensive, time-consuming and involve an uncertain outcome, and the inability to successfully and timely conduct clinical trials and obtain regulatory approval for our product candidates would substantially harm our business.

Clinical testing is expensive and usually takes many years to complete, and its outcome is inherently uncertain. Failure can occur at any time during the clinical trial process, and product candidates in later stages of clinical trials may fail to show the desired safety and efficacy traits despite having progressed through preclinical studies and initial clinical trials. To date, neither we nor our collaborators have initiated any clinical trials for any product candidates. We do not know whether planned clinical trials will begin on time, need to be redesigned, recruit and enroll patients on time or be completed on schedule, or at all. Clinical trials can be delayed, suspended or terminated for a variety of reasons, including in connection with:

- the inability to generate sufficient preclinical, toxicology or other *in vivo* or *in vitro* data to support the initiation of clinical trials;
- applicable regulatory authorities disagreeing as to the design or implementation of the clinical trials;
- obtaining regulatory authorization to commence a trial;
- reaching an agreement on acceptable terms with prospective contract research organizations, or CROs, and clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites;
- obtaining IRB approval at each site;
- developing and validating the companion diagnostic to be used in a clinical trial, if applicable;
- insufficient or inadequate supply or quality of product candidates or other materials necessary for use in clinical trials, or delays in sufficiently developing, characterizing or controlling a manufacturing process suitable for clinical trials;
- recruiting and retaining enough suitable patients to participate in a trial;
- having enough patients complete a trial or return for post-treatment follow-up;
- adding a sufficient number of clinical trial sites;
- inspections of clinical trial sites or operations by applicable regulatory authorities, or the imposition of a clinical hold;
- clinical sites deviating from trial protocol or dropping out of a trial;
- the inability to demonstrate the efficacy and benefits of a product candidate;
- discovering that product candidates have unforeseen safety issues, undesirable side effects or other unexpected characteristics;
- addressing patient safety concerns that arise during the course of a trial;

- receiving untimely or unfavorable feedback from applicable regulatory authorities regarding the trial or requests from regulatory authorities to modify the design of a trial;
- non-compliance with applicable regulatory requirements by us or third parties or changes in such regulations or administrative actions;
- suspensions or terminations by IRBs of the institutions at which such trials are being conducted, by the Data Safety Monitoring Board, or DSMB, for such trial or by the FDA or other regulatory authorities due to a number of factors, including those described above;
- third parties being unable or unwilling to satisfy their contractual obligations to us; or
- changes in our financial priorities, greater than anticipated costs of completing a trial or our inability to continue funding the trial.

Many of the factors that cause, or lead to, a delay in the commencement or completion of clinical trials may also ultimately lead to the denial of regulatory approval of our product candidates. Additionally, we or our collaborators may experience unforeseen events during or resulting from clinical trials that could delay or prevent receipt of marketing approval for or commercialization of product candidates. For example, clinical trials of product candidates may produce negative, inconsistent or inconclusive results, and we may decide, or regulators may require us, to conduct additional clinical trials or abandon development programs. Regulators may also revise the requirements for approving the product candidates, or such requirements may not be as we anticipate. If we or our collaborators are required to conduct additional clinical trials or other testing of product candidates beyond those that we or our collaborators currently contemplate, if we or our collaborators are unable to successfully complete clinical trials or other testing of such product candidates, if the results of these trials or tests are not positive or are only modestly positive or if there are safety concerns, we may:

- incur unplanned costs;
- be delayed in obtaining or fail to obtain marketing approval for product candidates;
- obtain marketing approval in some countries and not in others;
- obtain marketing approval for indications or patient populations that are not as broad as intended or desired;
- obtain marketing approval with labeling that includes significant use or distribution restrictions or safety warnings, including boxed warnings;
- be subject to additional post-marketing testing requirements;
- be subject to changes in the way the product is administered;
- have regulatory authorities withdraw or suspend their approval of the product or impose restrictions on its distribution;
- be sued; or
- experience damage to our reputation.

If we or our collaborators experience delays in the commencement or completion of our clinical trials, or if we or our collaborators terminate a clinical trial prior to completion, we may experience increased costs, have difficulty raising capital and/or be required to slow down the development and approval process timelines. Furthermore, the product candidates that are the subject of such trials may never receive regulatory approval, and their commercial prospects and our ability to generate product revenues from them could be impaired or not realized at all.

Any product candidates that we or our collaborators may develop will be novel and may be complex and difficult to manufacture, and if we experience manufacturing problems, it could result in delays in development and commercialization of such product candidates or otherwise harm our business.

Our product candidates involve or will involve novel genome editing technology and will require processing steps that are more complex than those required for most small molecule drugs, resulting in a relatively higher manufacturing cost. Moreover, unlike small molecules, the physical and chemical properties of biologics generally cannot be fully characterized. As a result, assays of the finished product may not be sufficient to ensure that such product will perform in the intended manner. Although we intend to employ multiple steps to control the manufacturing process, we may experience manufacturing issues with any of our product candidates that could cause production interruptions, including contamination, equipment or reagent failure, improper installation or operation of equipment, facility contamination, raw material shortages or contamination, natural disasters, disruption in utility services, human error, disruptions in the operations of our suppliers, inconsistency in cell growth and variability in product characteristics. We may encounter problems achieving adequate quantities and quality of clinical-grade materials that meet FDA, EMA or other comparable applicable standards or specifications with consistent and acceptable production yields and costs. Even minor deviations from normal manufacturing processes could result in reduced production yields, product defects and other supply disruptions. If microbial, viral or other contaminations are discovered in our product candidates or in the manufacturing facilities in which such product candidates are made, such manufacturing facilities may need to be closed for an extended period of time to investigate and remedy the contamination. Our manufacturing process for any allogeneic CAR T cell product candidate that we develop alone or with collaborators will be susceptible to product loss or failure due to logistical issues associated with the collection of white blood cells, or starting material, from healthy third-party donors, shipping such material to the manufacturing site, ensuring standardized production batch-to-batch in the context of mass production, freezing the manufactured product, shipping the final product globally and infusing patients with such product. Problems with the manufacturing process, even minor deviations from the normal process, could result in product defects or manufacturing failures that result in lot failures, product recalls, product liability claims or insufficient inventory.

As product candidates are developed through preclinical to late-stage clinical trials towards approval and commercialization, we expect that various aspects of the development program, such as manufacturing methods, may be altered along the way in an effort to help optimize processes and results. Such changes carry the risk that they will not achieve the intended objectives, and any of these changes could cause our product candidates to perform differently and affect the results of future clinical trials or our reliance on results of trials that have previously been conducted using the product candidate in its previous form. If the manufacturing process is changed during the course of product development, we or our collaborators may be required to repeat some or all of the previously conducted trials or conduct additional bridging trials, which could increase our costs and delay or impede our ability to obtain marketing approval.

We expect our manufacturing strategy for one or more of our product candidates may involve the use of contract manufacturing organizations, or CMOs, as well as establishing our own capabilities and infrastructure, including a manufacturing facility. We believe that development of our own manufacturing facility will provide us with enhanced control of material supply for both clinical trials and the commercial market, enable the more rapid implementation of process changes and help us achieve better long-term margins. We have no experience in developing a manufacturing facility and may never be successful in developing our own manufacturing facility or capability. The facilities used by us and our contract manufacturers to manufacture therapeutic product candidates must be approved by the FDA pursuant to inspections that will be conducted after we submit our BLA to the FDA. We do not control the manufacturing process of, and are currently completely dependent on, our contract manufacturing partners for compliance with cGMP, for the manufacture of our

product candidates. We may establish multiple manufacturing facilities as we expand our commercial footprint to multiple geographies, which will be costly and time consuming and may lead to regulatory delays. Even if we are successful, our manufacturing capabilities could be affected by cost-overruns, potential problems with scale-out, process reproducibility, stability issues, lot inconsistency, timely availability of reagents or raw materials, unexpected delays, equipment failures, labor shortages, natural disasters, utility failures, regulatory issues and other factors that could prevent us from realizing the intended benefits of our manufacturing strategy and have a material adverse effect on our business.

The FDA, the EMA and other foreign regulatory authorities may require us to submit samples of any lot of any product that may receive approval together with the protocols showing the results of applicable tests at any time. Under some circumstances, the FDA, the EMA or other foreign regulatory authorities may require that we not distribute a lot until the relevant agency authorizes its release. Slight deviations in the manufacturing process, including those affecting quality attributes and stability, may result in unacceptable changes in the product that could result in lot failures or product recalls. Lot failures or product recalls could cause us or our collaborators to delay product launches or clinical trials, which could be costly to us and otherwise harm our business. Problems in our manufacturing process also could restrict our or our collaborators' ability to meet market demand for products.

Any problems in our manufacturing process or facilities could make us a less attractive collaborator for potential partners, including larger pharmaceutical companies and academic research institutions, which could limit our access to additional attractive development opportunities.

We will rely on donors of T cells to manufacture product candidates from our allogeneic CAR T immunotherapy platform, and if we do not obtain an adequate supply of T cells from qualified donors, development of those product candidates may be adversely impacted.

We are developing a pipeline of allogeneic T cell product candidates that are engineered from healthy donor T cells, which vary in type and quality. This variability in type and quality of a donor's T cells makes producing standardized product candidates more difficult and makes the development and commercialization pathway of those product candidates more uncertain. We have developed a screening process designed to enhance the quality and consistency of T cells used in the manufacture of our CAR T cell product candidates. If we are unable to identify and obtain T cells from donors that satisfy our criteria in sufficient quantity, to obtain such cells in a timely manner or to address variability in donor T cells, development of our CAR T cell product candidates may be delayed or there may be inconsistencies in the product candidates we produce, which could negatively impact development of such product candidates, harm our reputation and adversely impact our business and prospects.

Delays in completing the manufacturing facility we are building or failure to achieve operating efficiencies from it may require us to devote additional resources and management time to manufacturing operations and may delay our product development timelines.

We have leased approximately 17,300 square feet of space for our manufacturing facility at a location approximately seven miles from our headquarters in Durham, North Carolina, at which we intend to establish and equip a manufacturing facility compliant with cGMP. We may face delays in the completion of the manufacturing facility and cannot guarantee that this facility will be available for manufacturing beginning with our BCMA product candidate. In addition, we may not experience the anticipated operating efficiencies as we commence manufacturing operations at the new facility. Any such delays may disrupt or delay the supply of our product candidates if we have not maintained a sufficient back-up supply of such product candidates through third-party manufacturers. Moreover, changing manufacturing facilities may also require that we or our collaborators conduct additional studies, make notifications to regulatory authorities, make additional filings to

regulatory authorities, and obtain regulatory authority approval for the new facilities, which may be delayed or which we may never receive. We will further need to comply with the FDA's and applicable foreign regulatory authorities' cGMP requirements for the production of product candidates for clinical trials and, if approved, commercial supply, and will be subject to FDA and comparable foreign regulatory authority inspection. These requirements include the qualification and validation of our manufacturing equipment and processes. We may not be able to develop or acquire the internal expertise and resources necessary for compliance with these requirements. Should we fail to comply with cGMP requirements, the opening of our manufacturing facility will be delayed. If we fail to achieve the operating efficiencies that we anticipate, our manufacturing and operating costs may be greater than expected, which could have a material adverse impact on our operating results.

In order to complete our planned manufacturing facility, we may be forced to devote greater resources and management time than anticipated, particularly in areas relating to operations, quality, regulatory, facilities and information technology. We also may encounter problems hiring and retaining the experienced scientific, quality-control and manufacturing personnel needed to operate our manufacturing processes. If we experience unanticipated employee shortage or turnover in any of these areas, we may not be able to effectively manage our ongoing manufacturing operations and we may not achieve the operating efficiencies that we anticipate from the new facility, which may negatively affect our product development timeline or result in difficulties in maintaining compliance with applicable regulatory requirements.

Any such problems could result in the delay, prevention or impairment of clinical development and commercialization of our product candidates.

We or our collaborators may experience delays or difficulties in enrolling patients in clinical trials, which could delay or prevent receipt of regulatory approvals.

We or our collaborators may not be able to initiate or continue clinical trials on a timely basis or at all for any product candidates we or our collaborators identify or develop if we or our collaborators are unable to locate and enroll a sufficient number of eligible patients to participate in the trials as required by applicable regulations or as needed to provide appropriate statistical power for a given trial. Additionally, some of our competitors may have ongoing clinical trials for product candidates that would treat the same indications as one or more of our product candidates, and patients who would otherwise be eligible for our clinical trials may instead enroll in our competitors' clinical trials.

Patient enrollment may also affected by many factors, including:

- severity and difficulty of diagnosing of the disease under investigation;
- size of the patient population and process for identifying subjects;
- eligibility and exclusion criteria for the trial in question;
- our or our collaborators' ability to recruit clinical trial investigators with the appropriate competencies and experience;
- design of the trial protocol;
- availability and efficacy of approved medications or therapies, or other clinical trials, for the disease or condition under investigation;
- perceived risks and benefits of the product candidate under trial or testing, or of the application of genome editing to human indications;
- availability of genetic testing for potential patients;

- efforts to facilitate timely enrollment in clinical trials;
- patient referral practices of physicians;
- ability to obtain and maintain subject consent;
- risk that enrolled subjects will drop out before completion of the trial;
- ability to monitor patients adequately during and after treatment; and
- proximity and availability of clinical trial sites for prospective patients.

We expect that some of our product candidates will focus on rare genetically defined diseases with limited patient pools from which to draw for enrollment in clinical trials. The eligibility criteria of our clinical trials will further limit the pool of available trial participants. In addition to the factors identified above, patient enrollment in any clinical trials we or our collaborators may conduct may be adversely impacted by any negative outcomes our competitors may experience, including adverse side effects, clinical data showing inadequate efficacy or failures to obtain regulatory approval.

Furthermore, our or our collaborators' ability to successfully initiate, enroll and conduct a clinical trial outside the United States is subject to numerous additional risks, including:

- difficulty in establishing or managing relationships with CROs and physicians;
- differing standards for the conduct of clinical trials;
- differing standards of care for patients with a particular disease;
- an inability to locate qualified local consultants, physicians and partners; and
- the potential burden of complying with a variety of foreign laws, medical standards and regulatory requirements, including the regulation of pharmaceutical and biotechnology products and treatments.

Enrollment delays in clinical trials may result in increased development costs for any of our product candidates, which may cause the value of our company to decline and limit our ability to obtain additional financing. If we or our collaborators have difficulty enrolling a sufficient number of patients to conduct clinical trials as planned, we may need to delay, limit or terminate ongoing or planned clinical trials, any of which may have an adverse effect on our results of operations and prospects.

Results of preclinical studies and early clinical trials of product candidates may not be predictive of results of later studies or trials. Our product candidates may not have favorable results in later clinical trials, if any, or receive regulatory approval.

Preclinical and clinical drug development is expensive and can take many years to complete, and its outcome is inherently uncertain. Failure can occur at any time during the preclinical study or clinical trial process. Despite promising preclinical or clinical results, any product candidate can unexpectedly fail at any stage of preclinical or clinical development. The historical failure rate for product candidates in our industry is high.

The results from preclinical studies or early clinical trials of a product candidate may not be predictive of the results from later preclinical studies or clinical trials, and interim results of a clinical trial are not necessarily indicative of final results. Product candidates in later stages of clinical trials may fail to show the desired safety and efficacy characteristics despite having progressed through preclinical studies and initial clinical trials. Many companies in the biopharmaceutical and biotechnology industries have suffered significant setbacks at later stages of development after achieving positive results in early stages of development, and we may face similar

setbacks. These setbacks have been caused by, among other things, preclinical findings made while clinical trials were underway or safety or efficacy observations made in clinical trials, including previously unreported adverse events. Moreover, non-clinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that believed their product candidates performed satisfactorily in preclinical studies and clinical trials nonetheless failed to obtain regulatory approval. The use of our genome editing technology in our product candidates has never undergone testing in humans and has only been tested in a limited manner in animals, and results from animal studies may not be predictive of clinical trial results. Even if any product candidates progress to clinical trials, these product candidates may fail to show the safety and efficacy in clinical development required to obtain regulatory approval, despite the observation of positive results in animal studies. Our or our collaborators' failure to replicate positive results from early research programs and preclinical or greenhouse studies may prevent us from further developing and commercializing those or other product candidates, which would limit our potential to generate revenues from them and harm our business and prospects.

For the foregoing reasons, we cannot be certain that any ongoing or future preclinical studies or clinical trials will be successful. Any safety or efficacy concerns observed in any one of our preclinical studies or clinical trials in a targeted area could limit the prospects for regulatory approval of product candidates in that and other areas, which could have a material adverse effect on our business and prospects.

If any of our product candidates do not work as intended or cause undesirable side effects, it could hinder or prevent receipt of regulatory approval or realization of commercial potential for them or our other product candidates and could substantially harm our business.

Our product candidates may be associated with off-target editing or other serious adverse events, undesirable side effects or unexpected characteristics. Results of clinical trials could reveal severe or recurring side effects, toxicities or unexpected events, including death. Off-target cuts could lead to disruption of a gene or a genetic regulatory sequence at an unintended site in the DNA. In those instances where we also provide a segment of DNA, it is possible that following off-target cut events, such DNA could be integrated into the genome at an unintended site, potentially disrupting another important gene or genomic element. There may also be delayed adverse events following exposure to therapeutics made with genome editing technologies due to persistent biologic activity of the genetic material or other components of products used to carry the genetic material. In addition to serious adverse events or side effects caused by product candidates we develop alone or with collaborators, the administration process or related procedures may also cause undesirable side effects. Any side effects may not be appropriately recognized or managed by the treating medical staff. We or our collaborators expect to have to train medical personnel using any product candidates we may develop to understand the side effect profiles for our clinical trials and upon any commercialization of such product candidates. Inadequate training in recognizing or managing the potential side effects of such product candidates could result in patient injury or death.

If any such events occur, clinical trials or commercial distribution of any product candidates or products we develop alone or with collaborators could be suspended or terminated, and our business and reputation could suffer substantial harm. Treatment-related side effects could affect patient recruitment and the ability of enrolled patients to complete the trial or result in potential liability claims. Regulatory authorities could order us or our collaborators to cease further development of, deny approval of or require us to cease selling any product candidates or products for any or all targeted indications. If we or our collaborators elect, or are required, to delay, suspend or terminate any clinical trial or commercialization efforts, the commercial prospects of such product candidates or products may be harmed, and our ability to generate product revenues from them or other product candidates that we develop may be delayed or eliminated.

Additionally, if we successfully develop a product candidate alone or with collaborators and it receives marketing approval, the FDA could require us to adopt a REMS to ensure that the benefits of treatment with such product candidate outweigh the risks for each potential patient, which may include, among other things, a communication plan to health care practitioners, patient education, extensive patient monitoring or distribution systems and processes that are highly controlled, restrictive and more costly than what is typical for the industry. We or our collaborators may also be required to adopt a REMS or engage in similar actions, such as patient education, certification of health care professionals or specific monitoring, if we or others later identify undesirable side effects caused by any product that we develop alone or with collaborators. Such identification could also have several additional significant negative consequences, such as:

- regulatory authorities may suspend, withdraw or limit approvals of such product, or seek an injunction against its manufacture or distribution;
- regulatory authorities may require additional warnings on the label, including “boxed” warnings, or issue safety alerts, Dear Healthcare Provider letters, press releases or other communications containing warnings or other safety information about the product;
- we may be required to create a medication guide outlining the risks of such side effects for distribution to patients;
- we may be required to change the way a product is administered or conduct additional trials;
- the product may become less competitive;
- we or our collaborators may decide to remove the product from the marketplace;
- we may be subject to fines, injunctions or the imposition of civil or criminal penalties;
- we could be sued and be held liable for harm caused to patients; and
- our reputation may suffer.

Any of these events could prevent us or our collaborators from achieving or maintaining market acceptance of any potential product.

We are subject to federal, state and non-U.S. healthcare and privacy laws and regulations relating to our business, and could face substantial penalties if we are determined not to have fully complied with such laws, which would have an adverse impact on our business.

Our business operations, as well as our current and anticipated future arrangements with investigators, healthcare professionals, consultants, third-party payors, customers and patients, expose or will expose us to broadly applicable foreign, federal, and state fraud and abuse and other healthcare and privacy laws and regulations. These laws constrain the business or financial arrangements and relationships through which we conduct our operations, including how we research, market, sell and distribute any potential products for which we may obtain marketing approval. Such laws include:

- the U.S. federal Anti-Kickback Statute, which prohibits, among other things, persons and entities from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward, or in return for, either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made under a U.S. healthcare program such as Medicare and Medicaid. A person or entity does not need to have actual knowledge of the U.S. federal Anti-Kickback Statute or specific intent to violate it in order to have committed a violation. In addition, the government may assert that a claim including items or services resulting from a violation of the

U.S. federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the civil False Claims Act;

- U.S. federal civil and criminal false claims laws and civil monetary penalties laws, including the civil False Claims Act, which can be enforced through civil whistleblower or qui tam actions, prohibits, among other things, individuals and entities from knowingly presenting, or causing to be presented, to the U.S. government, claims for payment or approval that are false or fraudulent, knowingly making, using or causing to be made or used, a false record or statement material to a false or fraudulent claim, or from knowingly making a false statement to avoid, decrease or conceal an obligation to pay money to the U.S. government;
- the U.S. Health Insurance Portability and Accountability Act of 1996, or HIPAA, which imposes criminal and civil liability for, among other things, knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program, including private third-party payors, or knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statement, in connection with the delivery of, or payment for, healthcare benefits, items or services. Similar to the U.S. federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation.
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009, or HITECH, and their implementing regulations, impose obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of individually identifiable health information without appropriate authorization by covered entities subject to the rule, such as health plans, healthcare clearinghouses and certain healthcare providers, as well as their business associates that perform certain services for or on their behalf involving the use or disclosure of individually identifiable health information;
- the U.S. Physician Payments Sunshine Act, which requires certain manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program (with certain exceptions) to report annually to CMS information related to payments or other "transfers of value" made to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors) and teaching hospitals, and requires applicable manufacturers and group purchasing organizations to report annually to the Centers for Medicare and Medicaid Services, or CMS, ownership and investment interests held by the physicians described above and their immediate family members; and
- analogous state and non-U.S. laws and regulations, such as state anti-kickback and false claims laws, which may apply to our business practices, including, but not limited to, research, distribution, sales and marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers, or by the patients themselves; state laws that require pharmaceutical and device companies to comply with the industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the U.S. government, or otherwise restrict payments that may be made to healthcare providers and other potential referral sources; state laws and regulations that require manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures and pricing information; state and local laws which require the registration of pharmaceutical sales representatives; state and non-U.S. laws governing the privacy and security of health information in some circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA; state and non-U.S., enacted and proposed, laws and regulations regarding the collection, distribution, use, security, and storage of personally identifiable information and other data relating to individuals (including the EU General Data Protection Regulation 2016/679 and the California Consumer Protection Act); and federal and state consumer protection laws are being applied to enforce regulations related to the online collection, use, and dissemination of data, thus complicating compliance efforts.

Efforts to ensure that our current and future business arrangements with third parties will comply with applicable healthcare laws and regulations will involve substantial costs. It is possible that governmental authorities may conclude that our business practices do not comply with current or future statutes, regulations, agency guidance or case law involving applicable healthcare laws. If our operations are found to be in violation of any of these or any other health regulatory laws that may apply to us, we may be subject to significant penalties, including the imposition of significant civil, criminal and administrative penalties, damages, monetary fines, disgorgement, individual imprisonment, possible exclusion from participation in Medicare, Medicaid and other U.S. healthcare programs, additional reporting requirements and oversight if we become subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance with these laws, contractual damages, reputational harm, diminished profits and future earnings, and curtailment or restructuring of our operations, any of which could adversely affect our ability to operate our business and our results of operations. Defending against any such actions can be costly, time-consuming and may require significant financial and personnel resources. Therefore, even if we are successful in defending against any such actions that may be brought against us, our business may be impaired. If any of the above occur, it could adversely affect our ability to operate our business and our results of operations.

We have received orphan drug designation for PBCAR0191 for the treatment of ALL and we may seek orphan drug designation for some or all of our other product candidates, but we may be unable to obtain such designations or to maintain the benefits associated with orphan drug designation, which may negatively impact our ability to develop or obtain regulatory approval for such product candidates and may reduce our revenue if we obtain such approval.

We may seek orphan drug designation for some or all of our product candidates in specific orphan indications in which there is a medically plausible basis for the use of these products. Under the Orphan Drug Act, the FDA may grant orphan designation to a drug or biologic intended to treat a rare disease or condition, defined as a disease or condition with a patient population of fewer than 200,000 in the United States, or a patient population greater than 200,000 in the United States when there is no reasonable expectation that the cost of developing and making available the drug or biologic in the United States will be recovered from sales in the United States for that drug or biologic. Orphan drug designation must be requested before submitting a biologics license application, or BLA. In the United States, orphan drug designation entitles a party to financial incentives such as opportunities for grant funding towards clinical trial costs, tax advantages and user-fee waivers. After the FDA grants orphan drug designation, the generic identity of the drug and its potential orphan use are disclosed publicly by the FDA. Orphan drug designation does not convey any advantage in, or shorten the duration of, the regulatory review and approval process. We have received orphan drug designation in the United States for PBCAR0191 for the treatment of ALL. Although we may seek orphan product designation for some or all of our other product candidates, we may never receive such designations.

If a product that has orphan drug designation subsequently receives the first FDA approval for a particular active ingredient for the disease for which it has such designation, the product is entitled to orphan product exclusivity, which means that the FDA may not approve any other applications, including a BLA, to market the same biologic for the same indication for seven years, except in limited circumstances such as a showing of clinical superiority to the product with orphan product exclusivity or if FDA finds that the holder of the orphan drug exclusivity has not shown that it can ensure the availability of sufficient quantities of the orphan drug to meet the needs of patients with the disease or condition for which the drug was designated. Even if we or our collaborators obtain orphan drug designation for a product candidate, we may not be the first to obtain marketing approval for any particular orphan indication due to the uncertainties associated with developing pharmaceutical products. Exclusive marketing rights in the United States may be limited if we or our collaborators seek approval for an indication broader than the orphan designated indication and may be lost if the FDA later determines that the request for designation was materially defective or if the manufacturer is

unable to assure sufficient quantities of the product to meet the needs of patients with the rare disease or condition. Further, even if a product obtains orphan drug exclusivity, that exclusivity may not effectively protect the product from competition because different drugs with different active moieties can be approved for the same condition. Even after an orphan drug is approved, the FDA can subsequently approve the same drug with the same active moiety for the same condition if the FDA concludes that the later drug is safer, more effective, or makes a major contribution to patient care. Furthermore, the FDA can waive orphan exclusivity if we or our collaborators are unable to manufacture sufficient supply of the product.

Similarly, in Europe, a medicinal product may receive orphan designation under Article 3 of Regulation (EC) 141/2000. This applies to products that are intended for a life-threatening or chronically debilitating condition and either (1) such condition affects no more than five in 10,000 persons in the EU when the application is made, or (2) the product, without the benefits derived from orphan status, would be unlikely to generate sufficient returns in the EU to justify the necessary investment. Moreover, in order to obtain orphan designation in the EU it is necessary to demonstrate that there exists no satisfactory method of diagnosis, prevention or treatment of such condition authorized for marketing in the EU or, if such a method exists, the product will be of significant benefit to those affected by the condition. In the EU, orphan medicinal products are eligible for financial incentives such as reduction of fees or fee waivers and applicants can benefit from specific regulatory assistance and scientific advice. Products receiving orphan designation in the EU can receive 10 years of market exclusivity, during which time no similar medicinal product for the same indication may be placed on the market. An orphan product can also obtain an additional two years of market exclusivity in the EU for pediatric studies. However, the 10-year market exclusivity may be reduced to six years if, at the end of the fifth year, it is established that the product no longer meets the criteria for orphan designation—for example, if the product is sufficiently profitable not to justify maintenance of market exclusivity. Additionally, marketing authorization may be granted to a similar product for the same indication at any time if:

- the second applicant can establish that its product, although similar, is safer, more effective or otherwise clinically superior;
- the first applicant consents to a second orphan medicinal product application; or
- the first applicant cannot supply enough orphan medicinal product.

If we or our collaborators do not receive or maintain orphan drug designation for product candidates for which we seek such designation, it could limit our ability to realize revenues from such product candidates.

We may seek fast-track designation for some or all of our product candidates, but we may not receive such designation, and even if we do, it may not lead to a faster development or regulatory review or approval process, and will not increase the likelihood that such product candidates will receive marketing approval.

We may seek fast-track designation and review for some or all of our product candidates. If a drug is intended for the treatment of a serious or life-threatening condition or disease, and nonclinical or clinical data demonstrate the potential to address an unmet medical need, the product may qualify for FDA fast track designation, for which sponsors must apply. The FDA has broad discretion whether or not to grant this designation. Thus, even if we or our collaborators believe a particular product candidate is eligible for this designation, the FDA may decide not to grant it. Moreover, even if we do receive fast track designation, we or our collaborators may not experience a faster development process, review or approval compared to conventional FDA procedures. In addition, the FDA may withdraw fast track designation if it believes that the designation is no longer supported by data from the clinical development program.

If the product candidates that we or our collaborators may develop receive regulatory approval in the United States or another jurisdiction, they may never receive approval in other jurisdictions, which would limit market opportunities for such product candidate and adversely affect our business.

Approval of a product candidate in the United States by the FDA or by the requisite regulatory agencies in any other jurisdiction does not ensure approval of such product candidate by regulatory authorities in other countries or jurisdictions. The approval process varies among countries and may limit our or our collaborators' ability to develop, manufacture, promote and sell product candidates internationally. Failure to obtain marketing approval in international jurisdictions would prevent the product candidates from being marketed outside of the jurisdictions in which regulatory approvals have been received. In order to market and sell product candidates in the EU and many other jurisdictions, we and our collaborators must obtain separate marketing approvals and comply with numerous and varying regulatory requirements. The approval procedure varies among countries and may involve additional preclinical studies or clinical trials both before and after approval. In many countries, any product candidate for human use must be approved for reimbursement before it can be approved for sale in that country. In some cases, the intended price for such product is also subject to approval. Further, while regulatory approval of a product candidate in one country does not ensure approval in any other country, a failure or delay in obtaining regulatory approval in one country may have a negative effect on the regulatory approval process in others. If we or our collaborators fail to comply with the regulatory requirements in international markets or to obtain all required marketing approvals, the target market for a particular potential product will be reduced, which would limit our ability to realize the full market potential for the product and adversely affect our business.

Recently enacted and future legislation may increase the difficulty and cost for us to obtain marketing approval of and commercialize any product candidates we or our collaborators develop and may adversely affect the prices for such product candidates.

In the United States and certain non-U.S. jurisdictions, there have been, and we expect there will continue to be, a number of legislative and regulatory changes and proposed changes regarding the healthcare system that could, among other things, prevent or delay marketing approval of our product candidates, restrict or regulate post-approval activities and affect our or our collaborators' ability to profitably sell any product candidates that obtain marketing approval.

For example, in March 2010, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, collectively the Affordable Care Act, was enacted in the United States. Among the provisions of the Affordable Care Act of importance to our product candidates, the Affordable Care Act establishes an annual, nondeductible fee on any entity that manufactures or imports specified branded prescription drugs and biologic agents; increases in the statutory minimum rebates a manufacturer must pay under the Medicaid Drug Rebate Program, extends manufacturers' Medicaid rebate liability to covered drugs dispensed to individuals who are enrolled in Medicaid managed care organizations, expands eligibility criteria for Medicaid programs, expansion of the entities eligible for discounts under the Public Health program, addresses a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted or injected, creates a new Medicare Part D coverage gap discount program, in which manufacturers must agree to offer 50% (and 70% commencing January 1, 2019) point-of-sale discounts off negotiated prices of applicable brand drugs to eligible beneficiaries during their coverage gap period, as a condition for the manufacturer's outpatient drugs to be covered under Medicare Part D, and creates a licensure framework for follow-on biologic products.

At this time, we are unsure of the full impact that the Affordable Care Act will have on our business. There have been judicial and political challenges to certain aspects of the Affordable Care Act. For example, since January 2017, President Trump has signed two executive orders and other directives designed to delay, circumvent, or

loosen certain requirements mandated by the Affordable Care Act. Concurrently, Congress has considered legislation that would repeal or repeal and replace all or part of the Affordable Care Act. While Congress has not passed comprehensive repeal legislation, two bills affecting the implementation of certain taxes under the Affordable Care Act have been signed into law. Tax legislation enacted on December 22, 2017 entitled "an Act to provide for reconciliation pursuant to titles II and V of the concurrent resolution on the budget for fiscal year 2018, Pub.L. 115–97," or the Tax Cuts and Jobs Act of 2017, includes a provision repealing, effective January 1, 2019, the tax-based shared responsibility payment imposed by the Affordable Care Act on certain individuals who fail to maintain qualifying health coverage for all or part of a year that is commonly referred to as the "individual mandate." Additionally, on January 22, 2018, President Trump signed a continuing resolution on appropriations for fiscal year 2018 that delayed the implementation of certain Affordable Care Act-mandated fees, including the so-called "Cadillac" tax on certain high cost employer-sponsored insurance plans, the annual fee imposed on certain health insurance providers based on market share. Further, the Bipartisan Budget Act of 2018, among other things, amends the Affordable Care Act, effective January 1, 2019, to close the coverage gap in most Medicare drug plans, commonly referred to as the "donut hole." More recently, in July 2018, the CMS published a final rule permitting further collections and payments to and from certain Affordable Care Act qualified health plans and health insurance issuers under the Affordable Care Act risk adjustment program in response to the outcome of federal district court litigation regarding the method CMS uses to determine this risk adjustment. Congress may consider other legislation to repeal or repeal and replace other elements of the Affordable Care Act.

In addition, other legislative changes have been proposed and adopted since the Affordable Care Act was enacted. On August 2, 2011, the Budget Control Act of 2011 was signed into law, which, among other things, created the Joint Select Committee on Deficit Reduction to recommend to Congress proposals for spending reductions. The Joint Select Committee did not achieve a targeted deficit reduction of at least $1.2 trillion for the years 2013 through 2021, triggering the legislation's automatic reduction to several government programs. This includes reductions to Medicare payments to providers of 2% per fiscal year, which went into effect on April 1, 2013 and, due to subsequent legislative amendments to the statute, including the BBA, will remain in effect through 2027 unless additional Congressional action is taken. On January 2, 2013, the American Taxpayer Relief Act of 2012 was signed into law, which, among other things, reduced Medicare payments to several providers, including hospitals, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years.

Further, there has been heightened governmental scrutiny recently over pharmaceutical pricing practices in light of the rising cost of prescription drugs and biologics. Such scrutiny has resulted in several recent Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for pharmaceutical products, some of which are included in the Trump administration's budget proposal for fiscal year 2019. Additionally, the Trump administration released a "Blueprint" to lower drug prices and reduce out of pocket costs of drugs that contains additional proposals to increase manufacturer competition, increase the negotiating power of certain federal healthcare programs, incentivize manufacturers to lower the list price of their products and reduce the out of pocket costs of drug products paid by consumers. The U.S. Department of Health and Human Services has begun the process of soliciting feedback on some of these measures and, at the same, is immediately implementing others under its existing authority. Although a number of these, and other potential, proposed measures will require authorization through additional legislation to become effective, Congress and the Trump administration have each indicated that it will continue to seek new legislative and/or administrative measures to control drug costs. At the state level, legislatures have increasingly passed legislation and implemented regulations designed to control pharmaceutical product and medical device pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access

and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. In addition, regional healthcare authorities and individual hospitals are increasingly using bidding procedures to determine what pharmaceutical products and medical devices to purchase and which suppliers will be included in their prescription drug and other healthcare programs.

Additionally, on May 30, 2018, the Trickett Wendler, Frank Mongiello, Jordan McLinn, and Matthew Bellina Right to Try Act of 2017, or the Right to Try Act, was signed into law. The law, among other things, provides a federal, or the framework for certain patients with life-threatening diseases or conditions to access certain investigational new drug products that have completed a Phase 1 clinical trial and that are undergoing investigation for FDA approval. Under certain circumstances, eligible patients can seek treatment without enrolling in clinical trials and without obtaining FDA permission under the FDA expanded access program. There is no obligation for a drug manufacturer to make its drug products available to eligible patients as a result of the Right to Try Act.

We expect that the Affordable Care Act, as well as other healthcare reform measures that may be adopted in the future, may result in more rigorous coverage criteria, new payment methodologies and in additional downward pressure on the price that we or our collaborators may receive for any approved or cleared product. Any reduction in reimbursement from Medicare or other government programs may result in a similar reduction in payments from private payors. We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative action, either in the United States or abroad. If we or our collaborators are slow or unable to adapt to new requirements or policies, or if we or our collaborators are not able to maintain regulatory compliance, any of our product candidates may lose any regulatory approval that may have been obtained and we may not achieve or sustain profitability, which would adversely affect our business.

Even if we obtain regulatory approval for any products that we develop alone or with collaborators, such products will remain subject to ongoing regulatory requirements, which may result in significant additional expense.

Even if products we develop alone or with collaborators receive regulatory approval, they will be subject to ongoing regulatory requirements for manufacturing, labeling, packaging, distribution, storage, advertising, promotion, sampling, record-keeping and submission of safety and other post-market information, among other things. Any regulatory approvals received for such products may also be subject to limitations on the approved indicated uses for which they may be marketed or to the conditions of approval, or contain requirements for potentially costly post-marketing testing and surveillance studies. For example, the holder of an approved BLA in the United States is obligated to monitor and report adverse events and any failure of a product to meet the specifications in the BLA. FDA guidance advises that patients treated with some types of gene therapy undergo follow-up observations for potential adverse events for as long as 15 years. Similarly, in the EU, pharmacovigilance obligations are applicable to all medicinal products. In addition to those, holders of a marketing authorization for gene or cell therapy products must detail, in their application, the measures they envisage to ensure follow-up of the efficacy and safety of these products. In cases of particular concern, marketing authorization holders for gene or cell therapy products in the EU may be required to design a risk management system with a view to identifying, preventing or minimizing risks and may be obliged to carry out post-marketing studies. In the United States, the holder of an approved BLA must also submit new or supplemental applications and obtain FDA approval for certain changes to the approved product, product labeling or manufacturing process. Similar provisions apply in the EU. Advertising and promotional materials must comply with FDA rules and are subject to FDA review, in addition to other potentially applicable federal and state laws. Similarly, in the EU any promotion of medicinal products is highly regulated and, depending on the specific jurisdiction involved, may require prior vetting by the competent national regulatory authority.

In addition, product manufacturers and their facilities are subject to payment of user fees and continual review and periodic inspections by the FDA and other regulatory authorities for compliance with cGMP requirements and adherence to commitments made in the BLA or foreign marketing application. If we, our collaborators or a regulatory agency discovers previously unknown problems with a product such as adverse events of unanticipated severity or frequency or problems with the facility where the product is manufactured or disagrees with the promotion, marketing or labeling of that product, a regulatory agency may impose restrictions relative to that product, the manufacturing facility or us or our collaborators, including requiring recall or withdrawal of the product from the market or suspension of manufacturing.

Moreover, if any of our product candidates are approved, our product labeling, advertising, promotion and distribution will be subject to regulatory requirements and continuing regulatory review. The FDA strictly regulates the promotional claims that may be made about drug products. In particular, a product may not be promoted for uses that are not approved by the FDA as reflected in the product's approved labeling.

If we or our collaborators fail to comply with applicable regulatory requirements following approval of any potential products we may develop, authorities may:

- issue an untitled enforcement letter or a warning letter asserting a violation of the law;
- seek an injunction, impose civil and criminal penalties, and impose monetary fines, restitution or disgorgement of profits or revenues;
- suspend or withdraw regulatory approval;
- suspend or terminate any ongoing clinical trials or implement requirements to conduct post-marketing studies or clinical trials;
- refuse to approve a pending BLA or comparable foreign marketing application (or any supplements thereto) submitted by us or our collaborators;
- restrict the labeling, marketing, distribution, use or manufacturing of products;
- seize or detain products or otherwise require the withdrawal or recall of products from the market;
- refuse to approve pending applications or supplements to approved applications that we or our collaborators submit;
- refuse to permit the import or export of products; or
- refuse to allow us or our collaborators to enter into government contracts.

Any government investigation of alleged violations of law could require us to expend significant time and resources in response and could generate negative publicity. The occurrence of any event or penalty described above may inhibit our or our collaborators' ability to commercialize products and our ability to generate revenues.

In addition, the FDA's policies, and policies of foreign regulatory agencies, may change, and additional regulations may be enacted that could prevent, limit or delay regulatory approval of product candidates. For example, in December 2016, the 21st Century Cures Act, or the Cures Act, was signed into law. The Cures Act, among other things, is intended to modernize the regulation of biologics and spur innovation, but its ultimate implementation is unclear. We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative or executive action, either in the United States or abroad. For example, certain policies of the Trump administration may impact our business and industry. Namely, the

Trump administration has taken several executive actions, including the issuance of a number of Executive Orders, that could impose significant burdens on, or otherwise materially delay, the FDA's ability to engage in routine oversight activities such as implementing statutes through rulemaking, issuance of guidance and review and approval of marketing applications. It is difficult to predict how these requirements will be implemented, and the extent to which they will impact the FDA's ability to exercise its regulatory authority. If these executive actions impose restrictions on the FDA's ability to engage in oversight and implementation activities in the normal course, our business may be negatively impacted. If we or our collaborators are slow or unable to adapt to changes in existing requirements or the adoption of new requirements, or if we or our collaborators are unable to maintain regulatory compliance, marketing approval that has been obtained may be lost and we may not achieve or sustain profitability.

Even if any product we develop alone or with collaborators receives marketing approval, such product may fail to achieve the degree of market acceptance by physicians, patients, healthcare payors and others in the medical community necessary for commercial success.

The commercial success of any potential therapeutic products we develop alone or with collaborators will depend upon their degree of market acceptance by physicians, patients, third-party payors and others in the medical community. Even if any potential therapeutic products we develop alone or with collaborators receive marketing approval, they may nonetheless fail to gain sufficient market acceptance by physicians, patients, healthcare payors and others in the medical community. The degree of market acceptance of any product we develop alone or with collaborators, if approved for commercial sale, will depend on a number of factors, including:

- the efficacy and safety of such product as demonstrated in clinical trials;
- the prevalence and severity of any side effects;
- the clinical indications for which the product is approved by FDA, the EMA or other regulatory authorities;
- product labeling or product insert requirements of the FDA, the EMA or other regulatory authorities, including any limitations or warnings contained in a product's approved labeling;
- public attitudes regarding genome editing technologies;
- our and any collaborators' ability to educate the medical community about the safety and effectiveness of the product;
- the willingness of the target patient population to try new therapies and of physicians to prescribe these therapies, as well as their willingness to accept a therapeutic intervention that involves the editing of the patient's genome;
- the potential and perceived advantages compared to alternative treatments;
- convenience and ease of administration compared to alternative treatments;
- any restrictions on the use of such product together with other treatments or products;
- market introduction of competitive products;
- publicity concerning such product or competing products and treatments;
- the ability to offer such product for sale at a competitive price;

- the strength of marketing and distribution support; and
- sufficient third-party coverage and adequate reimbursement.

If any products we develop alone or with collaborators do not achieve an adequate level of acceptance, we may not generate significant product revenues, and we may not become profitable.

If we are unable to establish sales and marketing capabilities or enter into agreements with third parties to sell and market any products we develop alone or with collaborators, the commercialization of such products may not be successful if and when they are approved.

We do not have a sales or marketing infrastructure and have no experience in the sale, marketing or distribution of biopharmaceutical or other commercial products. To achieve commercial success for any approved products for which we retain sales and marketing responsibilities, we must either develop a sales and marketing organization or outsource these functions to third parties. In the future, we may choose to build a focused sales, marketing and commercial support infrastructure to sell, or participate in sales activities with our collaborators for, certain product candidates if and when they are approved.

There are risks involved with both establishing our own commercial capabilities and entering into arrangements with third parties to perform these services. For example, restricted or closed distribution channels may make it difficult to distribute products to segments of the patient population, and the lack of complementary medicines to be offered by sales personnel may put us at a competitive disadvantage relative to companies with more extensive product lines.

Recruiting and training a sales force or reimbursement specialists are expensive and time consuming and could delay any product launch. If the commercial launch of a product for which we recruit a sales force and establish marketing and other commercialization capabilities is delayed or does not occur for any reason, we would have prematurely or unnecessarily incurred these commercialization expenses, and our investment would be lost if we cannot retain or reposition our commercialization personnel. Factors that may inhibit our efforts to commercialize products on our own include:

- unforeseen costs and expenses associated with creating an independent commercialization organization;
- our inability to recruit, train, retain and effectively manage adequate numbers of effective sales, marketing, customer service and other support personnel, including for reimbursement or medical affairs;
- the inability of sales personnel to obtain access to physicians or persuade adequate numbers of physicians to prescribe any future medicines; and
- the inability of reimbursement professionals to negotiate arrangements for formulary access, reimbursement and other acceptance by payors.

If we choose to enter into arrangements with third parties to perform sales, marketing, commercial support or distribution services, we may not be successful in entering into such arrangements or may be unable to do so on terms that are favorable to us. Entering into such third-party arrangements may subject us to a variety of risks, including:

- product revenues or profitability to us being lower than if we were to market and sell any products we or our collaborators may develop ourselves;
- our inability to exercise direct control over sales and marketing activities and personnel;
- failure of the third parties to devote necessary resources and attention to, or other inability to, sell and market any products we or our collaborators may develop;

- potential disputes with third parties concerning sales and marketing expenses, calculation of royalties and sales and marketing strategies; and
- unforeseen costs and expenses associated with sales and marketing.

If we do not establish effective commercialization capabilities, either on our own or in collaboration with third parties, we will not be successful in commercializing any of our product candidates that may receive approval.

If the market opportunities for any products we develop alone or with collaborators are smaller than our estimates, or if we are unable to successfully identify enough patients, our revenues may be adversely affected.

We focus some of our research and product development on treatments for rare genetic diseases. Our and our collaborators' projections of both the number of people who have these diseases, as well as the subset of people with these diseases who have the potential to benefit from treatment with product candidates we may develop, are based on estimates. These estimates may prove to be incorrect, and new studies may change the estimated incidence or prevalence of these diseases. The number of patients in the United States, Europe and elsewhere may turn out to be lower than expected, and patients may not be amenable to treatment with products that we may develop alone or with collaborators, or may become increasingly difficult to identify or gain access to, any of which would decrease our ability to realize revenue from any such products for such diseases.

The successful commercialization of potential products will depend in part on the extent to which governmental authorities and health insurers establish coverage, and the adequacy of reimbursement levels and pricing policies, and failure to obtain or maintain coverage and adequate reimbursement for any potential products that may receive approval, could limit marketability of those products and decrease our ability to generate revenue.

The availability of coverage and adequacy of reimbursement by government healthcare programs such as Medicare and Medicaid, private health insurers and other third-party payors is essential for most patients to be able to afford prescription medications such as the potential therapeutic products we develop alone or with collaborators. The ability to achieve acceptable levels of coverage and reimbursement for any potential products that may be approved by governmental authorities will have an effect on our and our collaborators' ability to successfully commercialize such products. Even if products we develop alone or with collaborators obtain coverage by a third-party payor, the resulting reimbursement payment rates may not be adequate or may require co-payments that patients find unacceptably high. If coverage and reimbursement in the United States, the EU or elsewhere is not available for any products we develop alone or with collaborators that may be approved, or any reimbursement that may become available is decreased or eliminated in the future, we and our collaborators may be unable to commercialize such products.

There is significant uncertainty related to the insurance coverage and reimbursement of newly approved drugs and biologics. In the United States, third-party payors, including private and governmental payors, such as the Medicare and Medicaid programs, play an important role in determining the extent to which new drugs and biologics will be covered. The Medicare and Medicaid programs increasingly are used as models in the United States for how private payors and other governmental payors develop their coverage and reimbursement policies for drugs and biologics. Some third-party payors may require pre-approval of coverage for new or innovative devices or drug therapies before they will reimburse healthcare providers who use such therapies. We cannot predict at this time what third-party payors will decide with respect to the coverage and reimbursement for any product that we develop alone or with collaborators.

No uniform policy for coverage and reimbursement for products exists among third-party payors in the United States. Therefore, coverage and reimbursement for products can differ significantly from payor to payor. As a

result, the coverage determination process is often a time-consuming and costly process that will require us or our collaborators to provide scientific and clinical support for the use of any potential products that may be approved to each payor separately, with no assurance that coverage and adequate reimbursement will be applied consistently or obtained in the first instance. Furthermore, rules and regulations regarding reimbursement change frequently, in some cases on short notice. Obtaining coverage and adequate reimbursement for products we develop alone or with collaborators may be particularly difficult because of the higher prices often associated with drugs administered under the supervision of a physician. In certain instances, payors may not separately reimbursement for the product itself, but only for the treatments or procedures in which such product is used. A decision by a third-party payor not to cover or separately reimburse for products that we develop alone or with collaborators or procedures using such products, could reduce physician utilization of any such products that may receive approval.

Third-party payors are increasingly challenging prices charged for pharmaceutical products and services, and many third-party payors may refuse to provide coverage and reimbursement for particular drugs or biologics when an equivalent generic drug, biosimilar or a less expensive therapy is available. If approved, it is possible that a third-party payor may consider any products that we develop alone or with collaborators as substitutable and only offer to reimburse patients for the less expensive product. Pricing of existing third-party therapeutics may limit the amount we will be able to charge for any products that may receive approval even if we or our collaborators show improved efficacy or improved convenience of administration such products. These payors may deny or revoke the reimbursement status of a given product or establish prices for new or existing marketed products at levels that are too low to enable us to realize an appropriate return on our investment in the product. If reimbursement is not available or is available only at limited levels, we or our collaborators may not be able to successfully commercialize any of the products that we develop, even if approved, and we may not be able to obtain a satisfactory financial return on them. Moreover, increasing efforts by governmental and third-party payors in the United States and abroad to cap or reduce healthcare costs may cause such organizations to limit both coverage and the level of reimbursement for newly approved products and, as a result, they may not cover or provide adequate payment for any products we develop alone or with collaborators that may receive approval. We expect to experience pricing pressures in connection with the sale of any products that may receive approval due to the trend toward managed health care, the increasing influence of health maintenance organizations and additional legislative changes. The downward pressure on healthcare costs in general, particularly prescription drugs and biologics and surgical procedures and other treatments, has become intense. As a result, increasingly high barriers are being erected to the entry of new products.

Outside the United States, international operations are generally subject to extensive governmental price controls and other market regulations, and we believe the increasing emphasis on cost-containment initiatives in Europe and elsewhere have and will continue to put pressure on the pricing and usage of any products we develop alone or with collaborators that may receive approval. In many countries, the prices of medical products are subject to varying price control mechanisms as part of national health systems. Other countries allow companies to fix their own prices for medical products, but monitor and control company profits. Additional international price controls or other changes in pricing regulation could restrict the amount that we or our collaborators are able to charge for products that we develop that may receive approval. Accordingly, in markets outside the United States, the reimbursement for such products may be reduced compared with the United States and may be insufficient to generate commercially reasonable revenue and profits.

Our product candidates for which we intend to seek approval as biologic products may face competition sooner than anticipated.

If we are successful in achieving regulatory approval to commercialize any biologic product candidate we develop alone or with collaborators, it may face competition from biosimilar products. In the United States, our

product candidates are regulated by the FDA as biologic products subject to approval under the BLA pathway. The Biologics Price Competition and Innovation Act of 2009, or the BPCIA, created an abbreviated pathway for the approval of biosimilar and interchangeable biologic products following the approval of an original BLA. The abbreviated regulatory pathway establishes legal authority for the FDA to review and approve biosimilar biologics, including the possible designation of a biosimilar as "interchangeable" based on its similarity to an existing brand product. Under the BPCIA, an application for a biosimilar product may not be submitted until four years following the date that the reference product was first licensed by the FDA. In addition, the approval of a biosimilar product may not be made effective by the FDA until 12 years after the reference product was first licensed by the FDA. During this 12-year period of exclusivity, another company may still market a competing version of the reference product if the FDA approves a full BLA for the competing product containing the sponsor's own preclinical data and data from adequate and well-controlled clinical trials to demonstrate the safety, purity and potency of their product. The law is complex and is still being interpreted and implemented by the FDA. As a result, its ultimate impact, implementation, and meaning are subject to uncertainty. While it is uncertain when such processes intended to implement BPCIA may be fully adopted by the FDA, any such processes could have a material adverse effect on the future commercial prospects for biological product candidates.

We believe that any of our product candidates that are approved as biological products under a BLA should qualify for the 12-year period of exclusivity. However, there is a risk that this exclusivity could be shortened due to congressional action or otherwise, or that the FDA will not consider such product candidates to be reference products for competing products, potentially creating the opportunity for generic competition sooner than anticipated. Other aspects of the BPCIA, some of which may impact the BPCIA exclusivity provisions, have also been the subject of recent litigation. Moreover, the extent to which a biosimilar product, once approved, will be substituted for any one of our or our collaborators' reference products in a way that is similar to traditional generic substitution for non-biologic products is not yet clear, and will depend on a number of marketplace and regulatory factors that are still developing. If competitors are able to obtain marketing approval for biosimilars referencing any products that we develop alone or with collaborators that may be approved, such products may become subject to competition from such biosimilars, with the attendant competitive pressure and potential adverse consequences.

Additional risks related to the identification, development and commercialization of our food and agricultural product candidates

The regulatory landscape that may govern any potential food or agricultural products that we or our collaborators may develop is uncertain and may adversely impact the development and commercialization activities of our food platform.

In the United States, the United States Department of Agriculture, or the USDA, regulates, among other things, the introduction (including the importation, interstate movement or release into the environment) of organisms and products altered or produced through genetic engineering determined to be plant pests or for which there is reason to believe are plant pests. Such organisms and products are considered "regulated articles." However, a petitioner may submit a request for a determination by the USDA of "nonregulated status" for a particular article. A petition for determination of nonregulated status must include detailed information, including relevant experimental data and publications, field trial reports and a description of the genotypic differences between the regulated article and the nonmodified recipient organism, among other things. Neither we nor, to our knowledge, our collaborators have obtained a determination from the USDA that any product candidates are not "regulated articles" under these regulations. We cannot predict whether the USDA, advocacy groups or other third parties will contend that these products are regulated articles. The USDA's regulations also require that companies obtain a permit or file a notification before engaging in the introduction (including the importation, interstate movement or release into the environment such as in field trials) of "regulated articles."

Additionally, a change in the way the USDA interprets its regulations, or a change in its regulations, could subject our or our collaborators' products to more burdensome regulations, thereby substantially increasing the time and costs associated with developing product candidates. Complying with the USDA's Part 340 regulations, including permitting requirements, is a costly, time-consuming process and could delay or prevent the commercialization of any potential food or agricultural products we or our collaborators may develop.

Any potential food or agricultural products that we or our collaborators develop may also be subject to extensive FDA food product regulations. Under sections 201(s) and 409 of the Federal Food, Drug, and Cosmetic Act, or the FDCA, any substance that becomes or is reasonably expected to become a component of food is a food additive and is therefore subject to FDA premarket review and approval, unless the substance is generally recognized, among qualified experts, as having been adequately shown to be safe under the conditions of its intended use (generally recognized as safe, or GRAS), or unless the use of the substance is otherwise excluded from the definition of a food additive, and any food that contains an unsafe food additive is considered adulterated under section 402(a)(2)(C) of the FDCA. The FDA may classify some or all of the potential food or agricultural products that we or our collaborators may develop as containing a food additive that is not GRAS or otherwise determine that such products contain significant compositional differences from existing plant products that require further review. Such classification would cause these potential products to require pre-market approval, which could delay the commercialization of these products. In addition, the FDA is currently evaluating its approach to the regulation of gene-edited plants. For example, on January 19, 2017, the FDA issued a notice in the Federal Register requesting public comment on the use of genome editing techniques to produce new plant varieties that are used for human or animal food or foods that are derived from such new plant varieties produced using genome editing. Among other things, the notice asked for data and information in response to questions about the safety of foods from gene-edited plants, such as whether categories of gene-edited plants present food safety risks different from other plants produced through traditional plant breeding. If the FDA enacts new regulations or policies with respect to gene-edited plants, such policies could result in additional compliance costs and delay or even prevent the commercialization of any of our product candidates, which could negatively affect our profitability. Any delay in the regulatory consultation process, or a determination that any potential products we or our collaborators may develop do not meet regulatory requirements by the FDA or other regulators, could cause a delay in, or prevent, the commercialization of our products, which may lead to reduced acceptance by the public and an increase in competitor products that may directly compete with ours, or could otherwise negatively impact our business, prospects and results of operations.

On May 4, 2018, the USDA issued a proposed rule implementing the National Bioengineered Food Disclosure Standard, with a proposed compliance date of January 1, 2020. Under this proposed rule, the label of a bioengineered, or BE, food must include a disclosure that the food is a BE food or contains a BE ingredient, with certain exceptions. This proposed rule defines BE food as "a food that contains genetic material that was has been modified through in vitro recombinant deoxyribonucleic acid, or DNA, techniques and for which the modification could not otherwise be obtained through conventional breeding or found in nature," except in the case of an incidental additive present in food at an insignificant level and that does not have any technical or functional effect in the food. If this proposed rule is passed and products developed by our collaborators based on our ARCUS technology are required to be labeled "BE," consumer perception of these products may be adversely affect.

In the EU, genetically modified foods, or GM foods, can only be authorized for sale on the market once they have been subject to rigorous safety assessments. The procedures for evaluation and authorization of GM foods are governed by Regulation (EC) 1829/2003 on GM food and feed and Directive 2001/18/EC on the release of genetically modified organisms, or GMOs, into the environment. If the GMO is not to be used in food or feed, then an application must be made under Directive 2001/18/EC. If the GMO is to be used in food or feed (but it is

not grown in the EU) then a single application for both food and feed purposes under Regulation 1829/2003 should be made. If the GMO is used in feed or food and it is also grown in the EU, an application for both cultivation and food/feed purposes needs to be carried out under Regulation (EC) 1829/2003. A different EU regulation, Regulation (EC) 1830/2003, regulates the labeling of products that contain GMOs that are placed on the EU market. Directive 2001/18/EC was amended by Directive (EU) 2015/412 which gives EU Member States more flexibility to allow, restrict or prohibit growing GMOs in their territory, on a range of environmental grounds, even if such crops were previously authorized at EU level. Under Directive 2015/412, EU Member State restrictions or prohibitions can only cover cultivation, and not the free circulation and import of genetically modified seeds and plant propagation material, and should be in conformity with the internal market rules of the EU Treaties. In March 2018, the Commission adopted Commission Directive (EU) 2018/350 amending Directive 2001/18/EC as regards the environmental risk assessment of GMOs. This measure aims to bring the assessment of the environmental risk of GM foods in the EU up to date with developments in scientific knowledge and technical progress. Member States have to transpose the Directive by September 29, 2019. Further EU level legislation on GM foods includes Directive 2009/41/EC on contained use of genetically modified micro-organisms and Regulation (EC) 1946/2003 on transboundary movements of GMOs.

We cannot predict whether or when any governmental authority will change its regulations with respect to any potential food or agricultural products that we develop alone or with collaborators. Advocacy groups have engaged in publicity campaigns and filed lawsuits in various countries against companies and regulatory authorities seeking to halt biotechnology approval activities or influence public opinion against genetically engineered products. In addition, governmental reaction to negative publicity concerning genetically edited agricultural products could result in greater regulation of genetic research and derivative products or regulatory costs that render our or our collaborators' development of potential food or agricultural products cost prohibitive. Our collaborators may use or integrate our products or technology into other products in ways that could subject those collaborators or products to additional regulation.

The overall agricultural industry is susceptible to agricultural price changes, and we may be exposed to risks from changes in commodity prices.

Changes in the prices of agricultural products could result in changes in demand for and prices of food and agricultural products that we or our collaborators may develop. We may be susceptible to these changes as a result of factors beyond our control, such as general economic conditions, seasonal fluctuations, weather conditions, demand, food safety concerns, product recalls and government regulations, subsidies or market export tariffs. If demand for agricultural products that we or our collaborators may develop is negatively impacted, our potential revenues under collaboration agreements for such products may decline, which could adversely affect our results of operations.

The successful commercialization of any food or agricultural products we develop will depend in part on our collaborators' ability to produce high-quality plants and seeds cost-effectively on a large scale and to accurately forecast demand for such potential products, and they may be unable to do so.

The production of commercial-scale quantities of food or agricultural products or seeds for them requires the multiplication of the plants or seeds through a succession of plantings and seed harvests. The cost-effective production of high-quality, high-volume quantities of such products or seeds may depend in part on our collaborators' abilities to scale production processes to produce plants and seeds in sufficient quantity to meet demand. Our collaborators' existing or future plant and seed production techniques may not enable timely meeting of large-scale production goals cost-effectively for any potential food or agricultural products that we and our collaborators may develop. Although we have worked with some of the largest plant biotechnology companies to edit gene targets and develop potential product candidates in a variety of crop plants, no commercial food or agricultural products have ever been developed using our technology.

In addition, because of the length of time it takes to produce commercial quantities of marketable plants and seeds, our collaborators will need to make seed production decisions well in advance of food product sales. The ability to accurately forecast demand can be adversely affected by a number of factors outside of their control, including changes in market conditions, environmental factors, such as pests and diseases, and adverse weather conditions.

The commercial success of any consumer-centric food or agricultural products that we or our collaborators may develop is reliant on the needs of food manufacturers and the recognition of shifting consumer preferences.

The commercial success of any consumer-centric products depends in part on the ability of the food manufacturer to accurately determine the shifting needs and desires of the ultimate consumer. We will not control the marketing, distribution labeling or any other aspects of the sale and commercialization of the manufacturers' food products. Consumer preferences may be a significant driver in the success of food manufacturers in their efforts to sell food and agricultural products, including products that we or our collaborators may develop. While current trends indicate that consumer preferences may be moving towards "healthier" options, we cannot predict whether such trends will continue or which types of food products will be demanded by consumers in the future. Additionally, as health and nutritional science continues to progress, consumer perception of what foods, nutrients and ingredients are considered "healthy" may shift. We and our collaborators may not be dynamic enough in responding to consumer trends and creating products that will be demanded by consumers in the future. In addition, if consumer demand is lower than our estimates or those of our collaborators, our ability to realize revenues from potential food or agricultural products may be limited. Failure by our collaborators to successfully recognize consumer trends could lower demand for potential food or agricultural products that we or our collaborators may develop, which could harm our business, results of operations and financial condition.

Some of the potential food products we develop alone or with collaborators may be distributed into markets or countries in which they have not received regulatory approval, which may result regulatory challenges or lawsuits.

The scale of the agricultural industry may make it difficult to monitor and control the distribution of any potential food products that we develop alone or with collaborators. As a result, such products may be sold inadvertently within jurisdictions where they are not approved for distribution. Such sales may lead to regulatory challenges or lawsuits against us, which could result in significant expenses and divert our management's attention, which could harm our business, results of operations and financial condition.

Risks related to our reliance on third parties

We have entered into significant arrangements with collaborators and expect to depend on collaborations with third parties for certain research, development and commercialization activities, and if any such collaborations are not successful, it may harm our business and prospects.

We have sought in the past, and anticipate that we will continue to seek in the future, third-party collaborators for the research, development and commercialization of certain product candidates and the research and development of certain technologies. For example, we are party to the Servier Agreement, pursuant to which we are focused on research and development of allogeneic chimeric antigen receptor T cell therapies for up to six oncology targets that utilize or incorporate our genome editing technologies, and we are also party to a collaboration with Gilead focused on research and development of therapeutic product candidates for the treatment of Hepatitis B using ARCUS nucleases. In addition, our food platform is based on a consumer-centric model, whereby our research and development activities and potential revenues are based on the needs and

commercial success of our collaborators. For example, we are a party to a commercial license agreement with Cargill focused on targeting and modifying certain genes related to saturated oil production in canola plants. Our likely collaborators for other product research and development arrangements include large and mid-size pharmaceutical and biotechnology companies biotechnology and food, beverage, nutrition and agricultural biotechnology companies, and our likely collaborators for other technology research and development arrangements include universities and other research institutions.

Working with collaborators poses several significant risks. We will likely have limited control over the amount and timing of resources that our collaborators dedicate to the product candidates or technologies we may seek to develop with them. A variety of factors may impact resource allocation decisions of collaborators, such as study or trial results, changes in the collaborator's strategic focus, turnover in personnel responsible for the development activities, financial capacity or external factors such as a business combination or change in control that diverts resources or creates competing priorities. Collaboration agreements may not lead to development or commercialization of product candidates or the development of technologies in the most efficient manner or at all. Resource allocation and other developmental decisions made by our collaborators may result in the delay or termination of research programs, studies or trials, repetition of or initiation of new studies or trials or provision of insufficient funding or resources for the completion of studies or trials or the successful marketing and distribution of any product candidates that may receive approval. Collaborators could independently develop, or develop with third parties, product candidates or technologies that compete directly or indirectly with our product candidates or technologies if the collaborators believe that competitive products or technologies are more likely to be successfully developed or can be commercialized under terms that are more economically attractive than ours. Collaborators may not properly obtain, maintain, enforce or defend our intellectual property or proprietary rights or may use our proprietary information in such a way that could jeopardize or invalidate our proprietary information or expose us to potential litigation. Disputes may arise between us and our collaborators that result in the delay or termination of the research, development or commercialization activities or that result in costly litigation or arbitration that diverts management attention and resources.

Our ability to generate revenues from these arrangements will depend on our collaborators' abilities to successfully perform the functions assigned to them in these arrangements. If our collaborations do not result in the successful development and commercialization of product candidates or technologies, or if one of our collaborators terminates its agreement with us, we may not receive any future funding or milestone or royalty payments under the collaboration. If we do not receive the funding we expect under these agreements, our development of product candidates or technologies could be delayed, and we may need additional resources to develop such product candidates or technologies. In addition, if one of our collaborators terminates its agreement with us, we may find it more difficult to find a suitable replacement collaborator or attract new collaborators and may need to raise additional capital to pursue further development or commercialization of the applicable product candidates or technologies. These events could delay development programs and negatively impact the perception of our company in business and financial communities. Failure to develop or maintain relationships with any current collaborators could result in the loss of opportunity to work with that collaborator or reputational damage that could impact our relationships with other collaborators in the relatively small industry communities in which we operate. Moreover, all of the risks relating to product development, regulatory approval and commercialization described in this prospectus apply to the activities of our collaborators. If our existing collaboration agreements or any collaborative or strategic relationships we may establish in the future are not effective and successful, it may damage our reputation and business prospects, delay or prevent the development and commercialization of product candidates and inhibit or preclude our ability to realize any revenues.

If we are not able to establish collaborations on commercially reasonable terms, we may have to alter our research, development and commercialization plans.

Our research and product development programs and the potential commercialization of any product candidates we develop alone or with collaborators will require substantial additional cash to fund expenses, and we expect that we will continue to seek collaborative arrangements with others in connection with the development and potential commercialization of current and future product candidates or the development of ancillary technologies. We face significant competition in establishing relationships with appropriate collaborators. In addition, there have been a significant number of recent business combinations among large pharmaceutical companies that have resulted in a reduced number of potential future collaborators. Whether we reach a definitive agreement for a collaboration will depend, among other things, upon our assessment of the collaborator's resources and expertise, the terms and conditions of the proposed collaboration and the proposed collaborator's evaluation of a number of factors. Those factors may include, among other things and as applicable for the type of potential product or technology, an assessment of the opportunities and risks of our technology, the design or results of studies or trials, the likelihood of approval, if necessary, by the USDA, the FDA or similar regulatory authorities outside the United States, the potential market for the subject product candidate, the costs and complexities of manufacturing and delivering such product candidate to patients, the potential of competing products and technologies and industry and market conditions generally.

Current or future collaborators may also consider alternative product candidates or technologies for similar indications that may be available to collaborate on and whether such a collaboration could be more attractive than the one with us. Additionally, we may be restricted under existing collaboration agreements from entering into future agreements on certain terms or for certain development activities with potential collaborators. For example, we have granted exclusive rights or options to Servier and Gilead for certain targets, and during the terms of our respective collaboration agreements with them we will be restricted from granting rights to other parties to use our ARCUS technology to pursue potential products that address those targets. Similarly, our collaboration agreements have in the past and may in the future contain non-competition provisions that could limit our ability to enter into strategic collaborations with future collaborators.

Collaborations are complex and time-consuming to negotiate and document. We may not be able to negotiate collaborations on a timely basis, on acceptable terms, or at all. If we do enter into additional collaboration agreements, the negotiated terms may force us to relinquish rights that diminish our potential profitability from development and commercialization of the subject product candidates or others. If we are unable to enter into additional collaboration agreements, we may have to curtail the research and development of the product candidate or technology for which we are seeking to collaborate, reduce or delay research and development programs, delay potential commercialization timelines, reduce the scope of any sales or marketing activities or undertake research, development or commercialization activities at our own expense. If we elect to increase our expenditures to fund research, development or commercialization activities on our own, we may need to obtain additional capital, which may not be available to us on acceptable terms or at all.

We expect to rely on third parties to conduct, supervise and monitor our clinical trials and some aspects of our research and preclinical testing, and if those third parties do not successfully carry out their contractual duties, comply with regulatory requirements, or otherwise perform in a satisfactory manner, we may not be able to obtain regulatory approval or commercialize product candidates, or such approval or commercialization may be delayed, and our business may be substantially harmed.

We may rely on medical institutions, clinical investigators, contract laboratories and other third parties, such as CROs, to conduct preclinical studies and future clinical trials for our product candidates. Nevertheless, we will be responsible for ensuring that each of our studies and trials is conducted in accordance with the applicable

protocol, legal and regulatory requirements and scientific standards, and our reliance on such third parties will not relieve us of our regulatory responsibilities.

Although we intend to design the trials for our product candidates either alone or with collaborators, third parties may conduct all of the trials. As a result, many important aspects of our research and development programs, including their conduct and timing, will be outside of our direct control. Our reliance on third parties to conduct future studies and trials will also result in less direct control over the management of data developed through studies and trials than would be the case if we were relying entirely upon our own staff. Communicating with outside parties can also be challenging, potentially leading to mistakes and difficulties in coordinating activities. Outside parties may have staffing difficulties, fail to comply with contractual obligations, experience regulatory compliance issues, undergo changes in priorities, become financially distressed or form relationships with other entities, some of which may be our competitors. We also face the risk of potential unauthorized disclosure or misappropriation of our intellectual property by CROs or other third parties, which may reduce our trade secret protection and allow our potential competitors to access and exploit our proprietary technology. For any violations of laws and regulations during the conduct of our preclinical studies and future clinical trials, we could be subject to warning letters or enforcement action that may include civil penalties up to and including criminal prosecution.

For example, we will remain responsible for ensuring that each of our clinical trials is conducted in accordance with the general investigational plan and protocols for the trial. Moreover, the FDA requires us to comply with regulations, commonly referred to as Good Clinical Practices, or GCPs, for conducting, monitoring, recording and reporting the results of clinical trials to assure that data and reported results are credible and accurate and that the rights, integrity and confidentiality of trial participants are protected. If we, our collaborators, our CROs or other third parties fail to comply with applicable GCPs, the clinical data generated in our clinical trials may be deemed unreliable and FDA or comparable foreign regulatory authorities may require us to perform additional clinical trials before approving our marketing applications. We also are required to register certain ongoing clinical trials and post the results of such completed clinical trials on a government-sponsored database, ClinicalTrials.gov, within certain timeframes. Failure to do so can result in fines, adverse publicity and civil and criminal sanctions.

If our CROs or other third parties do not successfully carry out their contractual duties or obligations, fail to meet expected deadlines, or if the quality or accuracy of the clinical data they obtain is compromised due to the failure to adhere to our clinical protocols or regulatory requirements or for any other reasons, trials for product candidates may be extended, delayed or terminated, and we or our collaborators may not be able to obtain regulatory approval for, or successfully commercialize, any product candidate that we develop. If we are required to repeat, extend the duration of or increase the size of any trials we conduct, it could significantly delay commercialization and require significantly greater expenditures. As a result of any of these factors, our financial results and the commercial prospects for any product candidate that we or our collaborators may develop would be harmed, our costs could increase and our ability to generate revenues could be delayed.

We expect to rely on third parties to supply raw materials or manufacture product supplies that are necessary for the conduct of preclinical studies, clinical trials and manufacturing of our product candidates, and failure by third parties to provide us with sufficient quantities of products, or to do so at acceptable quality levels or prices and on a timely basis, could harm our business.

We are dependent on third parties for the supply of various biological materials, such as cells, cytokines and antibodies, and the manufacture of product supplies, such as media, plasmids, mRNA and AAV viral vectors, that are necessary to produce our product candidates. The supply of these materials could be reduced or interrupted at any time. In such case, identifying and engaging an alternative supplier or manufacturer could result in delay, and we may not be able to find other acceptable suppliers or manufacturers on acceptable terms, or at all. Switching suppliers or manufacturers may involve substantial costs and is likely to result in a

delay in our desired clinical and commercial timelines. If we change suppliers or manufacturers for commercial production, applicable regulatory agencies may require us to conduct additional studies or trials. If key suppliers or manufacturers are lost, or if the supply of the materials is diminished or discontinued, we or our collaborators may not be able to develop, manufacture and market product candidates in a timely and competitive manner, or at all. If any of our product candidates receives approval, we will likely need to seek alternative sources of supply of raw materials or manufactured product supplies and there can be no assurance that we will be able to establish such relationships to provide such supplies on commercially reasonable terms or at acceptable quality levels, if at all. If we are unable to identify and procure additional sources of supply that fit our required needs, we could face substantial delays or incur additional costs in procuring such materials. In addition, manufactured product supplies are subject to stringent manufacturing processes and rigorous testing. Delays in the completion and validation of facilities and manufacturing processes of these materials could adversely affect the ability to complete studies or trials and commercialize any product candidates that may receive approval. Furthermore, if our suppliers or manufacturers encounter challenges relating to employee turnover, the supply and manufacturing of our materials could be delayed or adversely affected as such parties seek to hire and train new employees. These factors could cause the delay of studies or trials, regulatory submissions, required approvals or commercialization of product candidates that we or our collaborators may develop, cause us to incur higher costs and prevent us from commercializing products successfully. Furthermore, if our suppliers or manufacturers fail to meet contractual requirements, and we are unable to secure one or more replacements capable of production at a substantially equivalent cost, our or our collaborators' studies or trials may be delayed and we could lose potential revenue.

We may rely on third parties for at least a portion of the manufacturing process of product candidates, and failure by those parties to adequately perform their obligations could harm our business.

We do not currently own any facility that may be used as our clinical-scale manufacturing and processing facility and expect that we may rely on outside vendors for at least a portion of the manufacturing process of product candidates that we or our collaborators may develop. The facilities used by our contract manufacturers to manufacture product candidates must be approved by the FDA or other foreign regulatory agencies pursuant to inspections that will be conducted after we submit an application to the FDA or other foreign regulatory agencies. To the extent that we or our collaborators engage third parties for manufacturing services, we will not control the manufacturing process of, and will be completely dependent on, our contract manufacturing providers for compliance with cGMP requirements for manufacture of the product candidates. We have not yet caused any product candidates to be manufactured or processed on a commercial scale and may not be able to do so. We will make changes as we work to optimize the manufacturing process, and we cannot be sure that even minor changes in the process will result in products that are safe and effective. If our contract manufacturers cannot successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the FDA or other regulatory authorities, they will not be able to secure and/or maintain regulatory approval for their manufacturing facilities. In addition, we have no control over the ability of our contract manufacturers to maintain adequate quality control, quality assurance and qualified personnel. If the FDA or a comparable foreign regulatory authority does not approve these facilities for the manufacture of product candidates or if it withdraws any such approval in the future, we may need to find alternative manufacturing facilities, which would significantly impact our ability to develop, obtain regulatory approval for or market any of our or our collaborators' potential products.

Risks related to intellectual property

Our ability to compete may decline if we do not adequately protect our proprietary rights, and our proprietary rights do not necessarily address all potential threats to our competitive advantage.

Our commercial success depends upon obtaining and maintaining proprietary rights to our intellectual property estate, including rights relating to ARCUS and to our product candidates, as well as successfully defending these rights against third-party challenges and successfully enforcing these rights to prevent third-party infringement. We will only be able to protect ARCUS and product candidates from unauthorized use by third parties to the extent that valid and enforceable patents or effectively protected trade secrets cover them. Our ability to obtain and maintain patent protection for ARCUS and our product candidates is uncertain due to a number of factors, including that:

- we may not have been the first to invent the technology covered by our pending patent applications or issued patents;
- we may not be the first to file patent applications covering product candidates, including their compositions or methods of use, as patent applications in the United States and most other countries are confidential for a period of time after filing;
- our compositions and methods may not be patentable;
- our disclosures in patent applications may not be sufficient to meet the statutory requirements for patentability;
- any or all of our pending patent applications may not result in issued patents;
- others may independently develop identical, similar or alternative technologies, products or compositions or methods of use thereof;
- others may design around our patent claims to produce competitive technologies or products that fall outside of the scope of our patents;
- we may fail to identify patentable aspects of our research and development output before it is too late to obtain patent protection;
- we may not seek or obtain patent protection in countries that may eventually provide us a significant business opportunity;
- any patents issued to us may not provide a basis for commercially viable products, may not provide any competitive advantages or may be successfully challenged by third parties;
- others may identify prior art or other bases upon which to challenge and ultimately invalidate our patents or otherwise render them unenforceable; and
- the growing scientific and patent literature relating to engineered endonucleases, including our own patents and publications, may make it increasingly difficult or impossible to patent new engineered nucleases in the future.

Even if we have or obtain patents covering ARCUS or any product candidates or compositions, we and our collaborators may still be barred from making, using and selling such product candidates or technologies because of the patent rights of others. Others may have filed, and in the future may file, patent applications covering compositions, products or methods that are similar or identical to ours, which could materially affect our ability to successfully develop any product candidates or to successfully commercialize any approved

products alone or with collaborators. In addition, because patent applications can take many years to issue, there may be currently pending applications unknown to us that may later result in issued patents that we or our collaborators may infringe. These patent applications may have priority over patent applications filed by us.

The issuance of a patent is not conclusive as to its inventorship, scope, validity or enforceability, and our owned and licensed patents may be challenged in the courts or patent offices in the United States and abroad. Such challenges may result in loss of exclusivity or freedom to operate or in patent claims being narrowed, invalidated or held unenforceable, in whole or in part, which could limit our ability to stop others from using or commercializing similar or identical technology and products, or limit the duration of the patent protection of our technology and products. Furthermore, we cannot guarantee that any patents will be issued from any pending or future owned or licensed patent applications. Thus, even if our patent applications issue as patents, they may not issue in a form that will provide us with meaningful protection, prevent competitors from competing with us or otherwise provide us with any competitive advantage. In addition, third parties may be able to develop products that are similar to, or better than, ours in a way that is not covered by the claims of our patents, or may have blocking patents that could prevent us from marketing our products or practicing our own patented technology. Moreover, patents have a limited lifespan. In the United States, the natural expiration of a patent is generally 20 years after it is filed. Various extensions may be available; however the life of a patent, and the protection it affords, is limited. Without patent protection for current or future product candidates, we may be open to competition from generic versions of such potential products. Given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. As a result, our owned and licensed patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to those we or our collaborators may develop.

Obtaining and maintaining a patent portfolio entails significant expense, including periodic maintenance fees, renewal fees, annuity fees and various other governmental fees on patents and patent applications. These expenditures can be at numerous stages of prosecuting patent applications and over the lifetime of maintaining and enforcing issued patents. We may or may not choose to pursue or maintain protection for particular intellectual property in our portfolio. If we choose to forgo patent protection or to allow a patent application or patent to lapse purposefully or inadvertently, our competitive position could suffer. Furthermore, we employ reputable law firms and other professionals to help us comply with the various procedural, documentary, fee payment and other similar provisions we are subject to and, in many cases, an inadvertent lapse can be cured by payment of a late fee or by other means in accordance with the applicable rules. There are situations, however, in which failure to make certain payments or noncompliance with certain requirements in the patent process can result in abandonment or lapse of a patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such an event, our competitors might be able to enter the market, which would have a material adverse effect on our business.

Legal action that may be required to enforce our patent rights can be expensive and may involve the diversion of significant management time. There can be no assurance that we will have sufficient financial or other resources to file and pursue infringement claims, which typically last for years before they are concluded. In addition, these legal actions could be unsuccessful and result in the invalidation of our patents, a finding that they are unenforceable or a requirement that we enter into a licensing agreement with or pay monies to a third party for use of technology covered by our patents. We may or may not choose to pursue litigation or other actions against those that have infringed on our patents, or have used them without authorization, due to the associated expense and time commitment of monitoring these activities. If we fail to successfully protect or enforce our intellectual property rights, our competitive position could suffer, which could harm our results of operations.

Many biotechnology companies and academic institutions are currently pursuing a variety of different nuclease systems for genome engineering, such a TAL endonucleases, zinc-finger nucleases, and CRISPR/Cas9 nucleases, and the use of those nucleases in cancer immunotherapy, gene therapy and genome editing. Although those

nucleases are physically and chemically different from our ARCUS nucleases, those companies and institutions may seek patents that broadly cover aspects of cancer immunotherapy, gene therapy and genome editing using nucleases generally. Such patents, if issued, valid and enforceable, could prevent us from marketing our product candidates, if approved, practicing our own patented technology, or might require us to take a license which might not be available on commercially reasonable terms or at all. While we expect that we will continue to be able to patent our ARCUS nucleases for the foreseeable future, as the scientific and patent literature relating to engineered endonucleases increases, including our own patents and publications, it may become more difficult or impossible to patent new engineered endonucleases in the future.

If we fail to comply with our obligations in the agreements under which we license intellectual property rights from third parties or otherwise experience disruptions to our business relationships with our licensors, we could lose license rights that are important to our business.

We are a party to a number of intellectual property license agreements that are important to our business and expect to enter into additional license agreements in the future. Our existing license agreements impose, and we expect that future license agreements will impose, various diligence, milestone payment, royalty and other obligations on us. We may need to outsource and rely on third parties for many aspects of the development, sales and marketing of any products covered under our current and future license agreements. Delay or failure by these third parties could adversely affect the continuation of our license agreements with our licensors. If we fail to comply with any of our obligations under these agreements, or we are subject to a bankruptcy, our licensors may have the right to terminate the license, in which event we would not be able to market any products covered by the license.

In addition, disputes may arise regarding the payment of the royalties due to licensors in connection with our exploitation of the rights we license from them. Licensors may contest the basis of royalties we retained and claim that we are obligated to make payments under a broader basis. In addition to the costs of any litigation we may face as a result, any legal action against us could increase our payment obligations under the respective agreement and require us to pay interest and potentially damages to such licensors.

In some cases, patent prosecution of our licensed technology is controlled solely by the licensor. If such licensor fails to obtain and maintain patent or other protection for the proprietary intellectual property we license from such licensor, we could lose our rights to such intellectual property or the exclusivity of such rights, and our competitors could market competing products using such intellectual property. In that event, we may be required to expend significant time and resources to develop or license replacement technology. If we are unable to do so, we or our collaborators may be unable to develop or commercialize the affected product candidates, which could harm our business significantly. In other cases, we control the prosecution of patents resulting from licensed technology. In the event we breach any of our obligations related to such prosecution, we may incur significant liability to our licensing partners.

For example, our license agreement with Duke University, or Duke, which we refer to as the Duke License, imposes various payment, royalty and other obligations on us in order to maintain the license. If we fail to make royalty payments or milestone payments required under the Duke License, Duke may terminate the agreement. If we or our affiliates obtain a license from a third party to practice the Duke technology, we must use commercially reasonable efforts to secure a covenant not to sue Duke, or any of its faculty, students, employees or agents, for any research and development efforts conducted at Duke that resulted in the creation of any of its inventions or intellectual property rights arising therefrom. Additionally, because development of the Duke technology was funded in part by the U.S. government, it is subject to certain government rights and obligations, including the requirement that any products sold in the United States based upon such technology be substantially manufactured in the United States.

In addition, our cross-license agreement with Cellectis, or the Cellectis License, imposes various obligations on us in order to maintain the license. In particular, if we participate in or provide assistance to a third party challenging the validity, enforceability and/or patentability of any claim of any patent licensed to us by Cellectis under this agreement, Cellectis may terminate the agreement. The Cellectis License does not provide exclusive rights to use the licensed intellectual property and technology or rights in all relevant fields in which we may wish to develop or commercialize our technology and products in the future. As a result, we are not able to prevent competitors from developing and commercializing competitive products and technology that may use this technology. Additionally, we do not have the right to control the preparation, filing, prosecution, maintenance, enforcement and defense of patents and patent applications covering the technology that we license from Cellectis. Therefore, we cannot be certain that these patents and patent applications will be prepared, filed, prosecuted, maintained and defended in a manner consistent with the best interests of our business. If Cellectis or other licensors fail to prosecute, maintain, enforce and defend the patents subject to such licenses, or lose rights to those patents or patent applications, the rights we have licensed may be reduced or eliminated, and our right to develop and commercialize any of our products that are the subject of such licensed rights could be adversely affected.

If we fail to comply with our obligations under the Duke License or the Cellectis License, or arrangements with any other licensors, our counterparties may have the right to terminate these agreements, in which event we might not be able to develop, manufacture or market any product candidate that is covered by these agreements, which could materially adversely affect the value of any such product candidate. Termination of these agreements or reduction or elimination of our rights under these agreements may result in our having to negotiate new or reinstated agreements with less favorable terms, or cause us to lose our rights under these agreements, including our rights to important intellectual property or technology.

Disputes may arise regarding intellectual property subject to a license agreement, including:

- the scope of rights granted under the license agreement and other interpretation-related issues;
- the amounts of royalties, milestones or other payments due to our licensors;
- the extent to which our technology and processes infringe on intellectual property of the licensor that is not subject to the license agreement;
- the sublicensing of patent and other rights under our collaborative development relationships;
- our diligence obligations under the license agreement and what activities satisfy those diligence obligations;
- the ownership of inventions and know-how resulting from the joint creation or use of intellectual property by our licensors and us and our collaborators; and
- the priority of invention of patented technology.

Such disputes may be costly to resolve and may divert management’s attention away from day-to-day activities. If disputes over intellectual property that we have licensed from third parties prevent or impair our ability to maintain our licensing arrangements on acceptable terms, we or our collaborators may be unable to successfully develop and commercialize the affected product candidates.

Some of our in-licensed intellectual property has been discovered through government funded programs and thus may be subject to federal regulations such as “march-in” rights, certain reporting requirements and a preference for U.S.-based companies, and compliance with such regulations may limit our exclusive rights and our ability to contract with non-U.S. manufacturers.

Certain intellectual property rights that have been in-licensed pursuant to the Duke License have been generated through the use of U.S. government funding and are therefore subject to certain federal regulations.

As a result, the U.S. government may have certain rights to intellectual property embodied in our current or future product candidates pursuant to the Bayh-Dole Act of 1980, or the Bayh-Dole Act. These U.S. government rights include a non-exclusive, non-transferable, irrevocable worldwide license to use inventions for any governmental purpose. In addition, the U.S. government has the right, under certain limited circumstances, to require the licensor to grant exclusive, partially exclusive or non-exclusive licenses to any of these inventions to a third party if it determines that (1) adequate steps have not been taken to commercialize the invention, (2) government action is necessary to meet public health or safety needs or (3) government action is necessary to meet requirements for public use under federal regulations (also referred to as “march-in rights”). The U.S. government also has the right to take title to these inventions if the licensor fails to disclose the invention to the government or fails to file an application to register the intellectual property within specified time limits. Intellectual property generated under a government funded program is also subject to certain reporting requirements, compliance with which may require us to expend substantial resources. In addition, the U.S. government requires that any products embodying any of these inventions or produced through the use of any of these inventions be manufactured substantially in the United States, and the Duke License requires that we comply with this requirement. This preference for U.S. industry may be waived by the federal agency that provided the funding if the owner or assignee of the intellectual property can show that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture the products substantially in the United States or that under the circumstances domestic manufacture is not commercially feasible. This preference for U.S. industry may limit our ability to contract with non-U.S. product manufacturers for products covered by such intellectual property. To the extent any of our owned or licensed future intellectual property is also generated through the use of U.S. government funding, the provisions of the Bayh-Dole Act may similarly apply.

If we do not obtain patent term extension in the United States under the Hatch-Waxman Act and in foreign countries under similar legislation with respect to our product candidates, thereby potentially extending the term of marketing exclusivity for such product candidates, our business may be harmed.

In the United States, a patent that covers an FDA-approved drug or biologic may be eligible for a term extension designed to restore the period of the patent term that is lost during the premarket regulatory review process conducted by the FDA. Depending upon the timing, duration and conditions of FDA marketing approval of our product candidates, one or more of our U.S. patents may be eligible for limited patent term extension under the Drug Price Competition and Patent Term Restoration Act of 1984, or the Hatch-Waxman Act, which permits a patent term extension of up to five years for a patent covering an approved product as compensation for effective patent term lost during product development and the FDA regulatory review process. In the European Union, our product candidates may be eligible for term extensions based on similar legislation. In either jurisdiction, however, we may not receive an extension if we fail to apply within applicable deadlines, fail to apply prior to expiration of relevant patents or otherwise fail to satisfy applicable requirements. Even if we are granted such extension, the duration of such extension may be less than our request. If we are unable to obtain a patent term extension, or if the term of any such extension is less than our request, the period during which we can enforce our patent rights for that product will be in effect shortened and our competitors may obtain approval to market competing products sooner. The resulting reduction of years of revenue from applicable products could be substantial.

Patents and patent applications involve highly complex legal and factual questions, which, if determined adversely to us, could negatively impact our patent position.

The patent positions of biopharmaceutical and biotechnology companies and other actors in our fields of business can be highly uncertain and typically involve complex scientific, legal and factual analyses. In particular, the interpretation and breadth of claims allowed in some patents covering biopharmaceutical compositions may be uncertain and difficult to determine, and are often affected materially by the facts and

circumstances that pertain to the patented compositions and the related patent claims. The standards of the United States Patent and Trademark Office, or the USPTO, and its foreign counterparts are sometimes uncertain and could change in the future. Consequently, the issuance and scope of patents cannot be predicted with certainty. Patents, if issued, may be challenged, invalidated or circumvented. U.S. patents and patent applications may also be subject to interference or derivation proceedings, and U.S. patents may be subject to reexamination proceedings, post-grant review and/or *inter partes* review in the USPTO. International patents may also be subject to opposition or comparable proceedings in the corresponding international patent office, which could result in either loss of the patent or denial of the patent application or loss or reduction in the scope of one or more of the claims of the patent or patent application. In addition, such interference, derivation, reexamination, post-grant review, *inter partes* review and opposition proceedings may be costly. Accordingly, rights under any issued patents may not provide us with sufficient protection against competitive products or processes.

Furthermore, even if not challenged, our patents and patent applications may not adequately protect our technology and any product candidates or products that we develop alone or with collaborators or prevent others from designing their products to avoid being covered by our claims. If the breadth or strength of protection provided by the patent applications we hold with respect to product candidates or potential products is threatened, it could dissuade companies from collaborating with us to develop, and could threaten our or their ability to successfully commercialize, such product candidates. Furthermore, for U.S. applications in which all claims are entitled to a priority date before March 16, 2013, an interference proceeding can be provoked by a third party or instituted by the USPTO in order to determine who was the first to invent any of the subject matter covered by such patent claims.

In addition, changes in, or different interpretations of, patent laws in the United States and other countries may permit others to use our discoveries or to develop and commercialize our technology and product candidates or products without providing any compensation to us, or may limit the scope of patent protection that we are able to obtain. The laws of some countries do not protect intellectual property rights to the same extent as U.S. laws, and those countries may lack adequate rules and procedures for defending our intellectual property rights.

If the patent applications we hold or have in-licensed with respect to our current and future research and development programs and product candidates fail to issue, if their validity, breadth or strength of protection is threatened, or if they fail to provide meaningful exclusivity for our technology or any products and product candidates that we or our collaborators may develop, it could dissuade companies from collaborating with us to develop product candidates, encourage competitors to develop competing products or technologies and threaten our or our collaborators' ability to commercialize future product candidates. Any such outcome could have a material adverse effect on our business.

Third parties may assert claims against us alleging infringement of their patents and proprietary rights, or we may need to become involved in lawsuits to defend or enforce our patents, either of which could result in substantial costs or loss of productivity, delay or prevent the development and commercialization of product candidates, prohibit our use of proprietary technology or sale of potential products or put our patents and other proprietary rights at risk.

Our commercial success depends in part upon our ability to develop, manufacture, market and sell product candidates without alleged or actual infringement, misappropriation or other violation of the patents and proprietary rights of third parties. Litigation relating to infringement or misappropriation of patent and other intellectual property rights in the pharmaceutical, biotechnology and agricultural biotechnology industries is common, including patent infringement lawsuits, interferences, oppositions and reexamination proceedings before the USPTO and corresponding international patent offices. The various markets in which we plan to

operate are subject to frequent and extensive litigation regarding patents and other intellectual property rights. In addition, many companies in intellectual property-dependent industries, including the biotechnology, agricultural biotechnology and pharmaceutical industries, have employed intellectual property litigation as a means to gain an advantage over their competitors. Numerous United States, EU and other internationally issued patents and pending patent applications, which are owned by third parties, exist in the fields in which we and our collaborators are developing product candidates, and as the biotechnology, agricultural biotechnology and pharmaceutical industries expand and more patents are issued, the risk increases that our product candidates may be subject to claims of infringement of the intellectual property rights of third parties. For example, we are aware of certain patents held by third parties relating to the modification of T cells, including the production of CAR T cells. Although conducting clinical trials and other development activities with respect to our CAR T product candidates is not considered an act of infringement in the United States, if and when any of our CAR T product candidates may be approved by the FDA, those third parties may seek to enforce their patents by filing a patent infringement lawsuit against us. As a result of any patent infringement claims, or in order to avoid any potential infringement claims, we may choose to seek, or be required to seek, a license from the third party, which may require payment of substantial royalties or fees, or require us to grant a cross-license under our intellectual property rights, similar to the cross license we granted Cellectis as part of our patent litigation settlement. These licenses may not be available on reasonable terms or at all. Even if a license can be obtained on reasonable terms, the rights may be nonexclusive, which would give our competitors access to the same intellectual property rights. If we are unable to enter into a license on acceptable terms, we or our collaborators could be prevented from commercializing one or more product candidates, or forced to modify such product candidates, or to cease some aspect of our business operations, which could harm our business significantly. We or our collaborators might also be forced to redesign or modify our technology or product candidates so that we no longer infringe the third-party intellectual property rights, which may result in significant cost or delay to us, or which redesign or modification could be impossible or technically infeasible. Even if we were ultimately to prevail, any of these events could require us to divert substantial financial and management resources that we would otherwise be able to devote to our business.

Further, if a patent infringement suit is brought against us, our collaborators or our third-party service providers, our development, manufacturing or sales activities relating to the product or product candidate that is the subject of the suit may be delayed or terminated. In addition, defending such claims has in the past and may in the future cause us to incur substantial expenses and, if successful, could cause us to pay substantial damages if we are found to be infringing a third party's patent rights. These damages potentially include increased damages and attorneys' fees if we are found to have infringed such rights willfully. Some claimants may have substantially greater resources than we do and may be able to sustain the costs of complex intellectual property litigation to a greater degree and for longer periods of time than we could. In addition, patent holding companies that focus solely on extracting royalties and settlements by enforcing patent rights may target us. In addition, if the breadth or strength of protection provided by the patents and patent applications we own or in-license is threatened, it could dissuade companies from collaborating with us to license, develop or commercialize current or future product candidates.

We have been and may in the future be subject to third-party claims and similar adversarial proceedings or litigation in other jurisdictions regarding our infringement of the patent rights of third parties. Even if such claims are without merit, a court of competent jurisdiction could hold that these third-party patents are valid, enforceable and infringed, and the holders of any such patents may be able to block our or our collaborators' ability to further develop or commercialize the applicable product candidate unless we obtain a license under the applicable patents, or until such patents expire or are finally determined to be invalid or unenforceable. Similarly, if any third-party patents were held by a court of competent jurisdiction to cover aspects of our technologies, compositions, formulations, or methods of treatment, prevention or use, the holders of any such patents may be able to prohibit our use of those technologies, compositions, formulations, methods of

treatment, prevention or use or other technologies, effectively blocking our or our collaborators' ability to develop and commercialize the applicable product candidate until such patent expires or is finally determined to be invalid or unenforceable or unless we or our collaborators obtain a license.

Some of our competitors may be able to sustain the costs of complex intellectual property litigation more effectively than we can because they have substantially greater resources. In addition, intellectual property litigation, regardless of its outcome, may cause negative publicity, adversely impact prospective customers, cause product shipment delays or prohibit us from manufacturing, marketing or otherwise commercializing our products, services and technology. Any uncertainties resulting from the initiation and continuation of any litigation could have a material adverse effect on our ability to raise additional funds or otherwise have a material adverse effect on our business, results of operation, financial condition or cash flows.

If we or one of our licensors were to initiate legal proceedings against a third party to enforce a patent covering our technology or a product candidate, the defendant could counterclaim that our patent is invalid or unenforceable. In patent litigation in the United States and Europe, defendant counterclaims alleging invalidity or unenforceability are common. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, for example, lack of novelty, obviousness or non-enablement. Third parties might allege unenforceability of our patents because during prosecution of the patent an individual connected with such prosecution withheld relevant information, or made a misleading statement. The outcome of proceedings involving assertions of invalidity and unenforceability during patent litigation is unpredictable. With respect to the validity of patents, for example, we cannot be certain that there is no invalidating prior art of which we and the patent examiner were unaware during prosecution, but that an adverse third party may identify and submit in support of such assertions of invalidity. If a defendant were to prevail on a legal assertion of invalidity or unenforceability, we would lose at least part, and perhaps all, of the patent protection on our technology or product candidates. Our patents and other intellectual property rights also will not protect our technology if competitors design around our protected technology without infringing our patents or other intellectual property rights. Even if resolved in our favor, litigation or other legal proceedings relating to intellectual property claims may cause us to incur significant expenses and could distract our technical and management personnel from their normal responsibilities. In addition, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. There could also be public announcements of the results of hearings, motions or other interim proceedings or developments, and if securities analysts or investors view these announcements in a negative light, the price of our common stock could be adversely affected. Such litigation or proceedings could substantially increase our operating losses and reduce our resources available for development activities. We may not have sufficient financial or other resources to adequately conduct such litigation or proceedings.

Developments in patent law could have a negative impact on our business.

From time to time, the United States Supreme Court, or the Supreme Court, other federal courts, the United States Congress, or Congress, the USPTO and similar international authorities may change the standards of patentability, and any such changes could have a negative impact on our business. For example, the America Invents Act, or the AIA, which was passed in September 2011, resulted in significant changes to the U.S. patent system. An important change introduced by the AIA is that, as of March 16, 2013, the United States transitioned from a "first-to-invent" to a "first-to-file" system for deciding which party should be granted a patent when two or more patent applications are filed by different parties claiming the same invention. Under a "first-to-file" system, assuming the other requirements for patentability are met, the first inventor to file a patent application generally will be entitled to a patent on the invention regardless of whether another inventor had made the invention earlier. A third party that files a patent application in the USPTO after that date but before us could therefore be awarded a patent covering an invention of ours even if we made the invention before it was made by the third party. Circumstances could prevent us from promptly filing patent applications on our inventions.

The AIA limited where a patentee may file a patent infringement suit and provided opportunities for third parties to challenge any issued patent in the USPTO. Those provisions apply to all of our U.S. patents, regardless of when issued. Because of a lower evidentiary standard in USPTO proceedings compared to the evidentiary standard in U.S. federal courts necessary to invalidate a patent claim, a third party could potentially provide evidence in a USPTO proceeding sufficient for the USPTO to hold a claim invalid even though the same evidence would be insufficient to invalidate the claim if first presented in a district court action. Accordingly, a third party may attempt to use the USPTO procedures to invalidate our patent claims that would not have been invalidated if first challenged by the third party as a defendant in a district court action. These provisions could increase the uncertainties and costs surrounding the prosecution of our or our licensors' patent applications and the enforcement or defense of our or our licensors' issued patents.

Additionally, the Supreme Court has ruled on several patent cases in recent years either narrowing the scope of patent protection available in certain circumstances or weakening the rights of patent owners in certain situations, and there are other open questions under patent law that courts have yet to decisively address. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of our patents and patent applications. Depending on decisions by Congress, the federal courts and the USPTO, the laws and regulations governing patents could change in unpredictable ways and could weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future. In addition, the European patent system is relatively stringent in the type of amendments that are allowed during prosecution, but the complexity and uncertainty of European patent laws has also increased in recent years. Complying with these laws and regulations could limit our ability to obtain new patents in the future that may be important for our business.

If we were unable to protect the confidentiality of our trade secrets and enforce our intellectual property assignment agreements, our business and competitive position would be harmed.

In addition to patent protection, because we operate in the highly technical field of development of product candidates and products using genome editing, we rely significantly on trade secret protection in order to protect our proprietary technology and processes. Trade secrets are difficult to protect. Our policy is to enter into confidentiality and intellectual property assignment agreements with our employees, consultants, outside scientific collaborators, sponsored researchers and other advisors. These agreements generally require that the other party keep confidential and not disclose to third parties all confidential information developed by the party or made known to the party by us during the course of the party's relationship with us. These agreements also generally provide that inventions conceived by the party in the course of rendering services to us will be our exclusive property. However, we may be unsuccessful in executing such an agreement with each party who in fact conceives or develops intellectual property that we regard as our own. Our assignment agreements may not be self-executing or may be breached, and we may be forced to bring claims against third parties, or defend claims they may bring against us, to determine the ownership of what we regard as our intellectual property. In addition, these agreements may be held unenforceable and may not effectively assign intellectual property rights to us. If our trade secrets and other unpatented or unregistered proprietary information are disclosed, we are likely to lose such trade secret protection.

In addition, certain provisions in our intellectual property agreements may be susceptible to multiple interpretations. The resolution of any contract interpretation disagreement that may arise could affect the scope of our rights to the relevant intellectual property or technology, or affect financial or other obligations under the relevant agreement, either of which could have a material adverse effect on our business, financial condition, results of operations and prospects.

In addition, agreements with third parties typically restrict the ability of such third parties to publish data potentially relating to our trade secrets. Our academic collaborators typically have rights to publish data,

provided that we are notified in advance and may delay publication for a specified period of time in order to secure our intellectual property rights arising from the arrangement. In other cases, publication rights are controlled exclusively by us, although in some cases we may share these rights with other parties. We also conduct joint research and product development activities that may require us to share trade secrets under the terms of our research and development collaborations or similar agreements. In addition to contractual measures, we try to protect the confidential nature of our proprietary information using physical and technological security measures. Such measures may not provide adequate protection for our proprietary information. For example, our security measures may not prevent an employee or consultant with authorized access from misappropriating our trade secrets and providing them to a competitor, and the recourse we have available against such misconduct may not provide an adequate remedy to protect our interests fully. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret can be difficult, expensive and time consuming, and the outcome is unpredictable. In addition, courts outside the United States may be less willing to protect trade secrets. Furthermore, our proprietary information may be independently developed by others in a manner that could prevent legal recourse by us. Competitors could purchase any products we may develop and commercialize and attempt to reverse engineer and replicate some or all of the competitive advantages we derive from our development efforts, willfully infringe our intellectual property rights or design around our protected technology. In addition, our key employees, consultants, suppliers or other individuals with access to our proprietary technology and know-how may incorporate that technology and know-how into projects and inventions developed independently or with third parties. As a result, disputes may arise regarding the ownership of the proprietary rights to such technology or know-how, and any such dispute may not be resolved in our favor. If any of our confidential or proprietary information, including our trade secrets, were to be disclosed or misappropriated, or if any such information was independently developed by a competitor, our competitive position could be harmed and such disclosure or misappropriation could have a material adverse effect on our business.

We will not seek to protect our intellectual property rights in all jurisdictions throughout the world, and we may not be able to adequately enforce our intellectual property rights even in the jurisdictions where we seek protection.

Filing, prosecuting and defending patents on product candidates in all countries and jurisdictions throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States could be less extensive than those in the United States, assuming that rights are obtained in the United States. In-licensing patents covering product candidates in all countries throughout the world may similarly be prohibitively expensive, if such opportunities are available at all. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the United States. Consequently, we may not be able to prevent third parties from practicing our inventions in all countries outside the United States, or from selling or importing products made using our inventions in and into the United States or other jurisdictions.

We generally apply for patents in those countries where we intend to make, have made, use, offer for sale or sell products and where we assess the risk of infringement to justify the cost of seeking patent protection. However, we do not seek protection in all countries where we sell products and we may not accurately predict all the countries where patent protection would ultimately be desirable. If we fail to timely file a patent application in any such country or major market, we may be precluded from doing so at a later date. Competitors may use our technologies in jurisdictions where we do not pursue and obtain patent protection to develop their own products and may export otherwise infringing products to territories where we have patent protection, but where our ability to enforce our patent rights is not as strong as in the United States. These products may compete with any products that we or our collaborators may develop, and our patents or other intellectual property rights may not be effective or sufficient to prevent such competition.

The laws of some other countries do not protect intellectual property rights to the same extent as the laws of the United States. For example, European patent law restricts the patentability of methods of treatment of the human body more than U.S. law does. Patent protection must ultimately be sought on a country-by-country basis, which is an expensive and time-consuming process with uncertain outcomes. Accordingly, we may choose not to seek patent protection in certain countries, and we will not have the benefit of patent protection in such countries. In addition, the legal systems of some countries, particularly developing countries, do not favor the enforcement of patents and other intellectual property protection, especially those relating to biopharmaceuticals or biotechnologies. As a result, many companies have encountered significant difficulties in protecting and defending intellectual property rights in certain jurisdictions outside the United States. Such issues may make it difficult for us to stop the infringement of our patents, if obtained, or the misappropriation of our other intellectual property rights. For example, many other countries, including countries in the EU, have compulsory licensing laws under which a patent owner must grant licenses to third parties. In addition, many countries limit the enforceability of patents against third parties, including government agencies or government contractors. In these countries, patents may provide limited or no benefit. In those countries, we and our licensors may have limited remedies if patents are infringed or if we or our licensors are compelled to grant a license to a third party, which could materially diminish the value of those patents and could limit our potential revenue opportunities. Accordingly, our and our licensors' efforts to enforce intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we own or license.

Furthermore, proceedings to enforce our patent rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, subject our patents to the risk of being invalidated or interpreted narrowly, subject our patent applications to the risk of not issuing or provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate, and the damages or other remedies awarded to us, if any, may not be commercially meaningful, while the damages and other remedies we may be ordered to pay such third parties may be significant. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

We may not be successful in obtaining or maintaining necessary rights to product components and processes for our development pipeline through acquisitions and in-licenses.

We have rights, through licenses from third parties and under patents that we own, to the intellectual property to develop the product candidates we are currently developing alone or with collaborators. Because our programs may involve additional product candidates that may require the use of proprietary rights held by third parties, the growth of our business may depend in part on our ability to acquire, in-license or use these proprietary rights. In addition, product candidates may require specific formulations to work effectively and efficiently, and these rights may be held by others. We may be unable to acquire or in-license any compositions, methods of use, processes or other third-party intellectual property rights from third parties that we identify. The licensing and acquisition of third-party intellectual property rights is a competitive area, and a number of more established companies, or companies that have greater resources than we do, may also be pursuing strategies to license or acquire third-party intellectual property rights that we may consider necessary or attractive to develop or commercialize product candidates. These established companies may have a competitive advantage over us due to their size and greater cash resources and clinical development and commercialization capabilities. We may not be able to successfully complete such negotiations and ultimately acquire the rights to the intellectual property surrounding product candidates that we may seek to acquire.

For example, we sometimes collaborate with academic institutions to accelerate our preclinical research or development under written agreements with these institutions. Typically, these institutions provide us with an option to negotiate a license to any of the institution's rights in technology resulting from the strategic alliance.

Regardless of such right of first negotiation, we may be unable to negotiate a license within the specified time frame or under terms that are acceptable to us, and the institution may license such intellectual property rights to third parties, potentially blocking our ability to pursue our development and commercialization plans.

In addition, companies that perceive us to be a competitor may be unwilling to assign or license to us intellectual property rights that we require in order to successfully develop and commercialize potential products. We also may be unable to obtain such a license or assignment on terms that would allow us to make an appropriate return on our investment. In either event, our business and prospects for growth could suffer.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected. We may not be able to protect our rights to our trademarks and trade names, which we need to build name recognition among potential collaborators or customers in our markets of interest. At times, competitors may adopt trade names or trademarks similar to ours, thereby impeding our ability to build brand identity and possibly leading to market confusion. In addition, there could be potential trade name or trademark infringement claims brought by owners of other registered trademarks or trademarks that incorporate variations of our unregistered trademarks or trade names. Over the long term, if we are unable to successfully register our trademarks and trade names and establish name recognition based on our trademarks and trade names, then we may not be able to compete effectively and our business may be adversely affected. Our efforts to enforce or protect our proprietary rights related to trademarks, trade secrets, domain names, copyrights and other intellectual property may be ineffective and could result in substantial costs and diversion of resources and could adversely impact our financial condition or results of operations.

Risks related to our organization, structure and operations

We will need to expand our organization, and we may experience difficulties in managing this growth, which could disrupt our operations.

As of December 31, 2018, we had 127 employees. We will need to significantly expand our organization, and our future financial performance, ability to develop and commercialize product candidates alone or with collaborators and ability to compete effectively will depend in part on our ability to effectively manage any future growth. We may have difficulty identifying, hiring and integrating new personnel. Many of the biotechnology companies that we compete against for qualified personnel and consultants have greater financial and other resources, different risk profiles and a longer history than we do. If we are unable to continue to attract and retain high-quality personnel and consultants, the rate and success at which we can identify and develop product candidates, enter into collaborative arrangements and otherwise operate our business will be limited.

Future growth would impose significant additional responsibilities on our management, including the need to identify, recruit, maintain, motivate and integrate additional employees, consultants and contractors. Management may need to divert a disproportionate amount of its attention away from our day-to-day activities and devote a substantial amount of time to managing these growth activities. Due to our limited financial resources and the limited experience of our management team in managing a company with such anticipated growth, we may not be able to effectively manage the expected expansion of our operations or recruit and train additional qualified personnel. Moreover, the expected physical expansion of our operations may lead to significant costs and may divert our management and business development resources from other projects, such as the development of product candidates. If we are not able to effectively manage the expansion of our

operations, it may result in weaknesses in our infrastructure, increase our expenses more than expected, give rise to operational mistakes, loss of business opportunities, loss of employees and reduced productivity. Our future financial performance, ability to successfully commercialize any of our product candidates and our ability to compete effectively will depend, in part, on our ability to effectively manage any future growth.

We may engage in transactions that could disrupt our business, cause dilution to our stockholders or reduce our financial resources.

In the future, we may enter into transactions to acquire or in-license rights to product candidates, products or technologies or to acquire other businesses. If we do identify suitable candidates, we may not be able to enter into such transactions on favorable terms, or at all. Any such acquisitions or in-licenses may not strengthen our competitive position, and these transactions may be viewed negatively by customers or investors. We may decide to incur debt in connection with an acquisition or in-license, which may negatively impact our financial condition and restrict our operations, or issue our common stock or other equity securities to the stockholders of the acquired company, which would reduce the percentage ownership of our existing stockholders. We could incur losses resulting from undiscovered liabilities of the acquired business that are not covered by the indemnification we may obtain from the sellers of the acquired business. In addition, we may not be able to successfully integrate the acquired personnel, technologies and operations into our existing business in an effective, timely and nondisruptive manner. Such transactions may also divert management attention from day-to-day responsibilities, increase our expenses and reduce our cash available for operations and other uses. We cannot predict the number, timing or size of future acquisitions or in-licenses or the effect that they might have on our operating results.

Our future success depends on our ability to retain our Chief Executive Officer, Chief Scientific Officer, Chief Technology Officer and other key executives and to attract, retain and motivate qualified personnel.

We are highly dependent on the research and development experience, technical skills, leadership and continued service of certain members of our management and scientific teams, including Matthew Kane, our Chief Executive Officer, Derek Jantz, our Chief Scientific Officer, and Jeff Smith, our Chief Technology Officer. Although we have formal employment agreements with our executive officers, these agreements do not prevent them from terminating their employment with us at any time upon thirty days' written notice. We maintain a $1 million "key man" life insurance policy for our benefit on each of the lives of Drs. Jantz and Smith, but not on the lives of any of our other team members. The loss of the services of any of these persons could impede the achievement of our research, development and commercialization objectives.

Recruiting and retaining qualified scientific, clinical, manufacturing and, if we retain commercialization responsibility for any product candidate we develop alone or with collaborators, sales and marketing personnel will also be critical to our success. We may not be able to attract and retain these personnel on acceptable terms or at all given the competition among numerous pharmaceutical and biotechnology companies for similar personnel. We also experience competition for the hiring of scientific and clinical personnel from universities and research institutions. In addition, we rely on consultants and advisors, including scientific and clinical advisors, to assist us in formulating our research and development and commercialization strategies. Our consultants and advisors may be employed by employers other than us and may have commitments under consulting or advisory contracts with other entities that may limit their availability to us. The inability to recruit, integrate, motivate and retain additional skilled and qualified personnel, or the loss of services of certain executives, key employees, consultants or advisors, may impede the progress of our research, development and commercialization objectives and have a material adverse effect on our business.

We will incur increased costs as a result of operating as a public company, and our management will be required to devote substantial time to new compliance initiatives and corporate governance practices, including establishing and maintaining proper and effective internal control over financial reporting.

As a public company, we will incur significant legal, accounting and other expenses that we did not incur as a private company. We will be subject to the Securities Exchange Act of 1934, as amended, or the Exchange Act, including the reporting requirements thereunder, the Sarbanes-Oxley Act of 2002, the Dodd-Frank Wall Street Reform and Consumer Protection Act, the listing requirements of The Nasdaq Stock Market LLC, or Nasdaq, and other applicable securities rules and regulations, including requirements related to the establishment and maintenance of effective disclosure and financial controls and corporate governance practices. Our management and other personnel will need to devote a substantial amount of time to these compliance initiatives. Moreover, these rules and regulations will increase our legal and financial compliance costs, make some activities more difficult, time consuming or costly, and increase demand on our systems and resources. When we no longer qualify as an emerging growth company, legal, accounting and other expenses are expected to further increase.

Pursuant to Section 404 of the Sarbanes-Oxley Act of 2002, or Section 404, we will be required to furnish a report by our management on our internal control over financial reporting beginning with our second annual report following the completion of our initial public offering. However, while we remain an emerging growth company, we will not be required to include an attestation report on internal control over financial reporting issued by our independent registered public accounting firm. To achieve compliance with Section 404 of the Sarbanes-Oxley Act within the prescribed period, we will be engaged in a process to document and evaluate our internal control over financial reporting, which is both costly and challenging. We may need to hire more employees in the future or engage outside consultants to comply with these requirements, which will further increase our costs and expenses. If we fail to implement the requirements of Section 404 of the Sarbanes-Oxley Act in the required timeframe, we may be subject to sanctions or investigations by regulatory authorities, including the SEC and Nasdaq. Furthermore, if we are unable to conclude that our internal control over financial reporting is effective, our investors may lose confidence in the accuracy and completeness of our financial reports, the market price of our common stock could decline, and we could be subject to sanctions or investigations by regulatory authorities. Failure to implement or maintain an effective internal control system could also restrict our future access to the capital markets.

Our business and operations would suffer in the event of system failures or security breaches.

Despite the implementation of security measures, our computer systems, as well as those of third parties with which we have relationships, are vulnerable to damage from computer viruses, unauthorized access, natural and manmade disasters, terrorism, war and telecommunication and electrical failures. While we do not believe that we have experienced any such system failure, accident or security breach to date, if such an event were to occur and cause interruptions in our or their operations, it could result in delays and/or material disruptions of our research and development programs. For example, the loss of trial data from completed, ongoing or planned trials could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. To the extent that any disruption or security breach were to result in a loss of or damage to data or applications, or inappropriate disclosure of personal, confidential or proprietary information, we could incur liability and the development of our product candidates could be delayed.

The U.S. federal and various state and foreign governments have enacted or proposed requirements regarding the collection, distribution, use, security and storage of personally identifiable information and other data relating to individuals, and U.S. federal and state consumer protection laws are being applied to enforce regulations related to the online collection, use and dissemination of data. In the ordinary course of our business, we and third parties with which we have relationships will continue to collect and store sensitive data,

including intellectual property, clinical trial data, proprietary business information, personal data and personally identifiable information of our clinical trial subjects and employees, in data centers and on networks. The secure processing, maintenance and transmission of this information is critical to our operations. Despite our and our collaborators' security measures, our information technology and infrastructure may be vulnerable to attacks by hackers or internal bad actors, breaches due to employee error, technical vulnerabilities, malfeasance or other disruptions. A number of proposed and enacted federal, state and international laws and regulations obligate companies to notify individuals of security breaches involving particular personally identifiable information, which could result from breaches experienced by us or by third parties, including collaborators, vendors, contractors or other organizations with which we have formed strategic relationships. Although, to our knowledge, neither we nor any such third parties have experienced any material security breach, and even though we may have contractual protections with such third parties, any such breach could compromise our or their networks and the information stored there could be accessed, publicly disclosed, lost or stolen. Any such access, disclosure, notifications, follow-up actions related to such a security breach or other loss of information could result in legal claims or proceedings, liability under laws that protect the privacy of personal information and significant costs, including regulatory penalties, fines and legal expenses, and such an event could disrupt our operations, cause us to incur remediation costs, damage our reputation and cause a loss of confidence in us and our or such third parties' ability to conduct clinical trials, which could adversely affect our reputation and delay our research and development programs.

We or third parties with whom we have relationships may be adversely affected by natural or manmade disasters, and our business continuity and disaster recovery plans may not adequately protect us from a serious disaster.

Natural or manmade disasters could severely disrupt our operations and have a material adverse effect on our business, results of operations, financial condition and prospects. If a natural disaster, power outage or other event occurred that prevented us from using all or a significant portion of our facilities, that damaged our infrastructure or that otherwise disrupted operations, it may be difficult or, in certain cases, impossible for us to continue our business for a substantial period of time, and our research and development activities could be setback or delayed. The disaster recovery and business continuity plans we have in place may prove inadequate in the event of a serious disaster or similar event. We may incur substantial expenses as a result of the limited nature of our disaster recovery and business continuity plans, which could have a material adverse effect on our business, and such an event could disrupt our operations, cause us to incur remediation costs, damage our reputation and cause a loss of confidence in us and our or third parties' ability to conduct clinical trials, which could adversely affect our reputation and delay our research and development programs.

Our insurance policies are expensive and protect us only from some business risks, which leaves us exposed to significant uninsured liabilities.

We do not carry insurance for all categories of risk that our business may encounter. If we obtain marketing approval for any product candidates that we or our collaborators may develop, we intend to acquire insurance coverage to include the sale of commercial products, but we may be unable to obtain such insurance on commercially reasonable terms or in adequate amounts. We do not carry specific biological or hazardous waste insurance coverage, and our property, casualty and general liability insurance policies specifically exclude coverage for damages and fines arising from biological or hazardous waste exposure or contamination. Accordingly, in the event of contamination or injury, we could be held liable for damages or be penalized with fines in an amount exceeding our resources, and clinical trials or regulatory approvals for any of our product candidates could be suspended. We also expect that operating as a public company will make it more expensive for us to obtain director and officer liability insurance, and we may be required to accept reduced policy limits and coverage or incur substantially higher costs to obtain the same or similar coverage. As a result, it may be

more difficult for us to attract and retain qualified individuals to serve on our board of directors, our board committees or as our executive officers.

Insurance coverage is becoming increasingly expensive, and in the future we may not be able to maintain insurance coverage at a reasonable cost or in sufficient amounts to protect us against losses. We do not know if we will be able to maintain existing insurance with adequate levels of coverage, and any liability insurance coverage we acquire in the future may not be sufficient to reimburse us for any expenses or losses we may suffer. A successful liability claim or series of claims brought against us could require us to pay substantial amounts and cause our share price to decline and, if judgments exceed our insurance coverage, could adversely affect our results of operations and business, including preventing or limiting the development and commercialization of any product candidates that we or our collaborators may develop.

Unstable market and economic conditions may have serious adverse consequences on our business, financial condition and stock price.

Global credit and financial markets have experienced extreme volatility and disruptions in the past several years, including severely diminished liquidity and credit availability, declines in consumer confidence, declines in economic growth, increases in unemployment rates and uncertainty about economic stability, and similar deterioration in the credit and financial markets and confidence in economic conditions may occur in the future. Our general business strategy may be adversely affected by any such economic downturn, volatile business environment or unpredictable and unstable market conditions. If the current equity and credit markets deteriorate, or do not improve, it may make any necessary debt or equity financing more difficult, more costly and more dilutive. Failure to secure any necessary financing in a timely manner and on favorable terms could have a material adverse effect on our growth strategy, financial performance and stock price and could require us to delay or abandon clinical development plans. In addition, there is a risk that one or more of our current service providers, manufacturers or others with whom we have strategic relationships may not survive any difficult economic times, which could directly affect our ability to attain our operating goals.

As of December 31, 2018, we had cash and cash equivalents of $103.2 million. While we are not aware of any downgrades, material losses or other significant deterioration in the fair value of our cash and cash equivalents since December 31, 2018, deterioration of the global credit and financial markets could negatively impact our current portfolio of cash equivalents or our ability to meet our financing objectives. Furthermore, our stock price may decline due in part to the volatility of the stock market and any general economic downturn.

If we or any of our contract manufacturers or other suppliers fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur significant costs.

We and any of our contract manufacturers and suppliers are subject to numerous federal, state and local environmental, health and safety laws, regulations and permitting requirements, including those governing laboratory procedures; the generation, handling, use, storage, treatment and disposal of hazardous and regulated materials and wastes; the emission and discharge of hazardous materials into the ground, air and water; and employee health and safety. Our operations involve the use of hazardous and flammable materials, including chemicals and biological and radioactive materials. Our operations also produce hazardous waste. We generally contract with third parties for the disposal of these materials and wastes. We cannot eliminate the risk of contamination or injury from these materials. In the event of contamination or injury resulting from our use of hazardous materials, we could be held liable for any resulting damages, and any liability could exceed our resources. Under certain environmental laws, we could be held responsible for costs relating to any contamination at our current or past facilities and at third-party facilities. We also could incur significant costs associated with civil or criminal fines and penalties.

Compliance with applicable environmental laws and regulations may be expensive, and current or future environmental laws and regulations may impair our research and product development efforts. In addition, we cannot entirely eliminate the risk of accidental injury or contamination from these materials or wastes. Although we maintain workers' compensation insurance to cover us for costs and expenses we may incur due to injuries to our employees resulting from the use of hazardous materials, this insurance may not provide adequate coverage against potential liabilities. We do not carry specific biological or hazardous waste insurance coverage, and our property, casualty and general liability insurance policies (under which we currently have an aggregate of approximately $10 million in coverage) specifically exclude coverage for damages and fines arising from biological or hazardous waste exposure or contamination. Accordingly, in the event of contamination or injury, we could be held liable for damages or be penalized with fines in an amount exceeding our resources, and our clinical trials or regulatory approvals for any product candidate we develop alone or with collaborators could be suspended, which could have a material adverse effect on our business and financial condition.

In addition, we may incur substantial costs in order to comply with current or future environmental, health and safety laws, regulations and permitting requirements, and any third-party contract manufacturers and suppliers we engage will also be subject to such current and future regulations and requirements. These current or future laws, regulations and permitting requirements may impair our research, development or production efforts. Failure to comply with these laws, regulations and permitting requirements, either by us or by any third-party contract manufacturers and suppliers we engage, also may result in substantial fines, penalties or other sanctions or business disruption.

Our business operations, including our current and future relationships with third parties, will expose us to penalties for potential misconduct or improper activity, including non-compliance with regulatory standards and requirements.

Complex laws constrain our business and the financial arrangements and relationships through which we conduct our operations, including how we may research, market, sell and distribute product candidates alone or with collaborators. We are exposed to the risk of fraud or other misconduct by our employees, consultants and collaborators and, if we or our collaborators commence clinical trials and proceed to commercialization, our principal investigators and commercial partners, as well as healthcare professionals, third-party payors, patient organizations and customers. For example, misconduct by these parties could include intentional failures to comply with FDA regulations or the regulations applicable in the EU and other jurisdictions, provide accurate information to the FDA, the European Commission and other regulatory authorities, comply with healthcare fraud and abuse laws and regulations in the United States and abroad, report financial information or data accurately or disclose unauthorized activities to us. In particular, sales, marketing and business arrangements in the healthcare industry are subject to extensive laws and regulations intended to prevent fraud, misconduct, kickbacks, false and/or misleading statements, corruption of government officials, self-dealing and other abusive practices. These laws and regulations restrict or prohibit a wide range of pricing, discounting, marketing, promotion, sales commission and customer incentive programs and other business arrangements. Such misconduct also could involve the improper use or misrepresentation of information obtained in the course of clinical trials, creating fraudulent data in preclinical studies or clinical trials, illegal misappropriation of study materials or other property, or improper interactions with the FDA or other regulatory authorities, which could result in regulatory sanctions and cause serious harm to our or our collaborators' reputations.

Ensuring that our internal operations and current and future business arrangements with third parties comply with applicable healthcare laws and regulations will involve substantial costs. Additionally, we are subject to the risk that a person or government could allege such fraud or other misconduct, even if none occurred. It is possible that governmental authorities will conclude that our business practices do not comply with current or future statutes, regulations, agency guidance or case law involving applicable fraud and abuse or other

healthcare laws and regulations. If our operations are found to be in violation of any of the laws described above or any other governmental laws and regulations that may apply to us, we may be subject to significant penalties, including civil, criminal and administrative penalties, damages, fines, exclusion from government-funded healthcare programs, such as Medicare and Medicaid or similar programs in other countries or jurisdictions, additional reporting requirements and oversight if subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance with these laws, disgorgement, individual imprisonment, contractual damages, reputational harm, diminished profits and the curtailment or restructuring of our operations. If any of the physicians or other providers or entities with whom we expect to do business are found to not be in compliance with applicable laws, they may be subject to similar penalties, such as criminal, civil or administrative sanctions, including exclusions from government-funded healthcare programs and imprisonment, which could affect our ability to operate our business. Further, defending against any such actions can be costly and time-consuming and may require significant personnel resources. Therefore, even if we are successful in defending against any such actions that may be brought against us, our business may be impaired.

We intend to adopt, prior to the completion of this offering, a code of conduct applicable to all of our employees, but it is not always possible to identify and deter employee misconduct, and the precautions we take to detect and prevent such activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from government investigations or other actions or lawsuits stemming from a failure to comply with applicable laws or regulations. Additionally, we are subject to the risk that a person could allege such fraud or other misconduct, even if none occurred. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could result in the imposition of any of the penalties discussed above and have a significant impact on our business and financial condition.

The recently passed Tax Cuts and Jobs Act of 2017 could adversely affect our business and financial condition.

On December 22, 2017, President Trump signed into law new legislation, known as the Tax Cuts and Job Act of 2017, or the Tax Act, that significantly revises the Internal Revenue Code of 1986, as amended, or the Code. The Tax Act, among other things, contains significant changes to corporate taxation, including reduction of the corporate tax rate from a top marginal rate of 35% to a flat rate of 21%, limitation of the tax deduction for interest expense to 30% of adjusted taxable income (except for certain small businesses), limitation of the deduction for net operating losses to 80% of current year taxable income and elimination of net operating loss carrybacks, one-time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, elimination of U.S. tax on foreign earnings (subject to certain important exceptions), immediate deductions for certain new investments instead of deductions for depreciation expense over time, and modifying or repealing many business deductions and credits (including reducing the business tax credit for certain clinical testing expenses incurred in the testing of certain drugs for rare diseases or conditions). Notwithstanding the reduction in the corporate income tax rate, the overall impact of the Tax Act is uncertain, and our business and financial condition could be adversely affected. In addition, it is unknown if and to what extent various states will conform to the Tax Act. The impact of the Tax Act on holders of our common stock is likewise uncertain and could be adverse. We urge our stockholders to consult with their legal and tax advisors with respect to this legislation and the potential tax consequences of investing in or holding our common stock.

We are subject to complex tax rules relating to our business, and any audits, investigations or tax proceedings could have a material adverse effect on our business, results of operations and financial condition.

We are subject to income and non-income taxes in the United States. Income tax accounting often involves complex issues, and judgment is required in determining our provision for income taxes and other tax liabilities. We recently formed a subsidiary in Australia and may operate in other non-US jurisdictions in the future. We could become subject to income and non-income taxes in non-US jurisdictions as well. In addition, many

jurisdictions have detailed transfer pricing rules, which require that all transactions with non-resident related parties be priced using arm's length pricing principles within the meaning of such rules. The application of withholding tax, goods and services tax, sales taxes and other non-income taxes is not always clear and we may be subject to tax audits relating to such withholding or non-income taxes. We believe that our tax positions are reasonable and our tax reserves are adequate to cover any potential liability. We are currently not subject to any tax audits. However, the Internal Revenue Service or other taxing authorities may disagree with our positions. If the Internal Revenue Service or any other tax authorities were successful in challenging our positions, we may be liable for additional tax and penalties and interest related thereto or other taxes, as applicable, in excess of any reserves established therefor, which may have a significant impact on our results and operations and future cash flow.

We may not be able to utilize all, or any, of our net operating loss carryforwards.

We have incurred substantial losses during our history, do not expect to become profitable in the near future, and we may never achieve profitability. As of December 31, 2018, we had U.S. federal and state net operating loss carryforwards of approximately $40.0 million and $39.8 million, respectively. Our federal net operating loss carryforwards of $19.4 million will begin to expire in 2030 while the remaining federal net operating loss carryforwards of $20.6 million carry forward indefinitely. The state net operating loss carryforwards begin to expire in 2025. In addition, we have U.S. federal and state research and development tax credits of $3.6 million and an amount less than $0.1 million as of December 31, 2018, respectively, available to offset future U.S. federal and state income taxes, which begin to expire in 2027 and 2030, respectively. Unused losses generated in taxable years ending after December 31, 2017 will not expire and may be carried forward indefinitely, but will be deductible only to the extent of 80% of current year taxable income (computed without regard to the deduction for the net operating losses) in any given year. It is uncertain if and to what extent various states will conform to the newly enacted federal tax law.

As of December 31, 2018, we have a valuation allowance for the full amount of our net deferred tax assets as the realization of the net deferred tax assets is not determined to be more likely than not. In addition, Sections 382 and 383 of the Code limit a corporation's ability to utilize its net operating loss carryforwards and certain other tax attributes (including research credits) to offset any future taxable income or tax if the corporation experiences a cumulative ownership change of more than 50% over any rolling three-year period. State net operating loss carryforwards (and certain other tax attributes) may be similarly limited. A Section 382 ownership change can therefore result in significantly greater tax liabilities than a corporation would incur in the absence of such a change, and any increased liabilities could adversely affect the corporation's business, results of operations, financial condition and cash flow. We have not yet determined if any prior change in the ownership of our equity or any change in such ownership in connection with this offering, would trigger a Section 382 ownership change. It is possible that such a Section 382 ownership change has already occurred in prior periods. Furthermore, additional ownership changes may occur in the future as a result of events over which we will have little or no control, including purchases and sales of our equity by our 5% stockholders, the emergence of new 5% stockholders, additional equity offerings or redemptions of our stock or certain changes in the ownership of any of our 5% stockholders. As a result, our pre-2018 net operating loss carryforwards (and research tax credits) may expire prior to being used, and our net operating loss carryforwards and tax credits generated in 2018 and thereafter will be subject to a percentage limitation, upon an ownership change. Similar provisions of state tax law may also apply to limit our use of accumulated state tax attributes. As a result, even if we attain profitability, we may be unable to use all or a material portion of our NOLs and other tax attributes, which could adversely affect our future cash flows.

Risks related to this offering and owning our common stock

An active trading market for our common stock may not develop, and you may not be able to sell your shares at or above the initial public offering price.

Prior to this offering, there has been no public market for shares of our common stock. Although we anticipate that our common stock will be approved for listing on Nasdaq, an active trading market for our common stock may never develop or be sustained following this offering. The lack of an active trading market may impair your ability to sell your shares at the time you wish to sell them or at a price that you consider reasonable, reduce the market value of your shares, impair our ability to raise capital and impair our ability to attract, motivate and retain our employees through equity incentive awards. The initial public offering price of our common stock will be determined through negotiations between us and the underwriters, and it may not be indicative of the market price of our common stock in an open market after this offering. Consequently, you may not be able to sell your common stock at or above the initial public offering price and may lose a portion or all of your investment.

We expect that our common stock price will fluctuate significantly, which could result in substantial losses for purchasers of shares in this offering.

Our stock price is likely to be volatile. You should invest in our common stock only if you can withstand a significant loss and wide fluctuations in the market value of your investment. The market price for our common stock may be influenced by many factors, including those discussed in this “Risk factors” section and the following:

- inconsistent trading volume levels of our common stock;
- announcements or expectations regarding debt or equity financing efforts;
- sales of common stock by us, our insiders or our other stockholders;
- actual or anticipated fluctuations in our financial condition and operating results;
- failure to meet or exceed financial estimates and projections of the investment community or that we provide to the public;
- results from or delays in our studies or trials, or those of our collaborators, competitors or companies perceived to be similar to us;
- delay, failure or discontinuation of any of our product development and research programs, or those of our collaborators, competitors or companies perceived to be similar to us;
- announcements about new research programs or product candidates from us or our collaborators, our competitors or companies perceived to be similar to us;
- announcements by us, our collaborators, our competitors or companies perceived to be similar to us relating to significant acquisitions, strategic partnerships or alliances, joint ventures, collaborations or capital commitments;
- actual or anticipated changes in our growth rate relative to our competitors or companies perceived to be similar to us;
- fluctuations in the valuation of our collaborators, our competitors or companies perceived to be comparable to us;

- a lack of, limited or withdrawal of coverage by security analysts, or positive or negative recommendations by them;
- actual or expected changes in estimates as to financial results, development timelines or recommendations by securities analysts;
- publication of research reports about us, genome editing or the biopharmaceutical and agricultural biotechnology industries;
- developments or changing views regarding the use of genomic products, including those that involve genome editing;
- our ability to effectively manage our growth;
- the recruitment or departure of key personnel;
- the results of any efforts by us to identify, develop, acquire or in-license additional product candidates, products or technologies;
- unanticipated serious safety concerns related to the use of any of our product candidates, or those of our competitors or companies perceived to be similar to us;
- the termination of a collaboration agreement, licensing agreement or other strategic arrangement or the inability to establish additional strategic arrangements on favorable terms, or at all;
- regulatory actions with respect to any of our product candidates, or those of our competitors or companies perceived to be similar to us;
- developments or disputes concerning patent applications, issued patents or other proprietary rights;
- regulatory or legal developments in the United States and other countries;
- changes in physician, hospital, healthcare provider or agricultural practices that may make our or our collaborators' products less useful;
- changes in the structure of healthcare payment systems;
- significant lawsuits, such as products liability, patent or stockholder litigation; and
- general economic, industry and market conditions.

These and other market and industry factors may cause the market price and demand for our common stock to fluctuate substantially, regardless of our actual operating performance. These factors may have a material adverse effect on the market price and liquidity of our common stock, which may limit or prevent you from readily selling your shares of common stock and may affect our ability to obtain financing or enter into desired strategic relationships.

We could be subject to securities class action litigation.

In the past, securities class action litigation has often been brought against a company following a decline in the market price of its securities. This risk is especially relevant for us because biopharmaceutical companies have experienced significant stock price volatility in recent years. If we face such litigation, it could result in substantial costs and a diversion of management's attention and resources, which could harm our business.

If you purchase shares of common stock in this offering, you will suffer immediate dilution of your investment.

The initial public offering price of our common stock will be substantially higher than the net tangible book value per share of our common stock. Therefore, if you purchase shares of our common stock in this offering, you will pay a price per share that substantially exceeds our net tangible book value per share after this offering. Based on an assumed initial public offering price of $16.00 per share, which is the midpoint of the price range set forth on the cover page of this prospectus, you will experience immediate dilution of $12.15 per share, representing the difference between our pro forma as adjusted net tangible book value per share, after giving effect to this offering, and the assumed initial public offering price. As of December 31, 2018, there were 7,763,464 shares subject to outstanding options with a weighted-average exercise price of $5.00 per share. To the extent these outstanding options are ultimately exercised, you will incur further dilution. In addition, purchasers of common stock in this offering will have contributed approximately 56.3% of the aggregate price paid by all purchasers of our stock but will own only approximately 43.7% of our common stock outstanding after this offering. For a further description of the dilution that you will experience immediately after this offering, see “Dilution.”

A significant portion of our total outstanding shares is restricted from immediate resale but may be sold into the market in the near future, which could cause the market price of our common stock to decline significantly, even if our business is doing well.

Sales of a substantial number of shares of our common stock in the public market, or the perception in the market that the holders of a large number of shares of common stock intend to sell shares, could reduce the market price of our common stock. Based on the number of shares of common stock outstanding on December 31, 2018, after this offering and after giving effect to the conversion of all outstanding shares of our convertible preferred stock into 22,301,190 shares of our common stock upon the closing of this offering and the automatic settlement of our convertible promissory notes, or the 2019 Notes, including accrued interest, into 2,922,424 shares of our common stock in connection with the closing of this offering, assuming an initial public offering price per share of $16.00, which is the midpoint of the price range set forth on the cover page of this prospectus, we will have 49,030,259 shares of common stock outstanding, or 50,215,259 if the underwriters exercise their option to purchase additional shares in full. Of these shares, the 7,900,000 shares, or 9,085,000 shares if the underwriters exercise their option to purchase additional shares in full, we are selling in this offering may be resold in the public market immediately, unless purchased by our affiliates. The remaining 41,130,259 shares are currently restricted under securities laws or as a result of lock-up or other agreements, but will be able to be sold after this offering as described in the “Shares eligible for future sale” section of this prospectus.

Substantially all of our shares of common stock will be available for sale in the public market beginning 180 days after the date of this prospectus following the expiration of lock-up agreements between our stockholders and the underwriters. JP Morgan Securities LLC, Goldman Sachs & Co. LLC and Jefferies LLC may release these stockholders from their lock-up agreements with the underwriters at any time and without notice, except for officers and directors, for whom notice of such waiver would be provided two business days before the effective date thereof, which would allow for earlier sales of shares in the public market.

In addition, as of December 31, 2018, up to 9,304,492 shares of common stock that are either subject to outstanding options or reserved for future issuance under our employee benefit plans will become eligible for sale in the public market to the extent permitted by the provisions of various vesting schedules, the lock-up agreements and Rule 144 and Rule 701 under the Securities Act of 1933, as amended, or the Securities Act. If these additional shares of common stock are sold, or if it is perceived that they will be sold, in the public market, the trading price of our common stock could decline.

Moreover, after this offering, holders of an aggregate of 35,754,780 shares of our common stock will have rights, subject to conditions, to require us to file registration statements covering their shares or to include

their shares in registration statements that we may file for ourselves or other stockholders. We also plan to register all 13,215,287 shares of common stock that we may issue under our equity compensation plans or that are issuable upon exercise of outstanding options. Once we register these shares, they can be freely sold in the public market upon issuance and once vested, subject to volume limitations applicable to affiliates and the lock-up agreements described in "Underwriting." If substantial portions of these additional shares are sold, or if it is perceived that they will be sold, in the public market, the market price of our common stock could decline.

After this offering, our executive officers, directors and significant stockholders will have the ability to directly or indirectly influence all matters submitted to stockholders for approval.

Based on their beneficial ownership as of December 31, 2018, our executive officers, directors, current 5% or greater stockholders and affiliated entities will beneficially own approximately 25.0% of the outstanding shares of our common stock after this offering, assuming no exercise of the underwriters' option to purchase additional shares and assuming that group does not participate in this offering. As a result, these stockholders, acting together, will have significant influence over all matters that require approval by our stockholders, including the election of directors and approval of significant corporate transactions. Corporate action might be taken even if other stockholders, including those who purchase shares in this offering, oppose them. This concentration of ownership might also have the effect of delaying or preventing a change of control of our company that other stockholders may view as beneficial.

We have broad discretion in the use of the net proceeds from this offering and may not use them effectively.

Our management will have broad discretion in the application of the net proceeds from this offering, and we could spend the proceeds in ways that do not improve our results of operations or enhance the value of our common stock. We expect that we will use the net proceeds from this offering to advance and expand our clinical and preclinical development programs and for working capital and other general corporate purposes, which may include the costs of establishing a manufacturing facility, as set forth under "Use of proceeds." However, our use of these proceeds may differ substantially from our current plans. The failure by our management to apply these funds effectively could harm our business and financial condition. Pending their use, we may invest the net proceeds from this offering in a manner that does not produce income or that loses value. These investments may not yield a favorable return to our investors.

We do not currently intend to pay dividends on our common stock.

We do not intend to pay any dividends to holders of our common stock for the foreseeable future. We currently intend to invest our future earnings, if any, to fund our growth. Therefore, you are not likely to receive any dividends on your common stock for the foreseeable future, and the success of an investment in our common stock will depend upon any future appreciation in its value. Consequently, you may need to sell all or part of your common stock after price appreciation, which may never occur, as the only way to realize any future gains on your investment.

If securities or industry analysts do not publish research or reports about us and our business, or if they issue an adverse or misleading opinion regarding our common stock, our stock price and trading volume could decline.

The trading market for our common stock will be influenced by the research and reports that industry or securities analysts publish about us and our business. We do not currently have, and may never obtain, research coverage by securities and industry analysts. If no or few securities or industry analysts commence coverage of us, the trading price for our stock would be negatively impacted. In the event we obtain securities or industry analyst coverage, if any of the analysts who cover us issue an adverse or misleading opinion regarding us, our business model, our intellectual property or our stock performance, or if our preclinical studies and clinical trials and operating results fail to meet the expectations of analysts, our stock price would

likely decline. If one or more of these analysts ceases coverage of us or fails to publish reports on us regularly, we could lose visibility in the financial markets, which in turn could cause our stock price or trading volume to decline.

Provisions in our amended and restated certificate of incorporation and restated bylaws that will become effective upon the closing of this offering or Delaware law might discourage, delay or prevent a change in control of our company or changes in our management and therefore depress the trading price of our common stock.

Provisions in our amended and restated certificate of incorporation and our restated bylaws, which will become effective upon the closing of this offering, may discourage, delay or prevent a merger, acquisition or other change in control of our company that stockholders may consider favorable, including transactions in which you might otherwise receive a premium for your shares. These provisions could also limit the price that investors might be willing to pay in the future for shares of our common stock, thereby depressing the market price of our common stock. In addition, because our board of directors is responsible for appointing the members of our management team, these provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our board of directors. Among other things, these provisions include those establishing:

- a classified board of directors with three-year staggered terms, which may delay the ability of stockholders to change the membership of a majority of our board of directors;
- no cumulative voting in the election of directors, which limits the ability of minority stockholders to elect director candidates;
- the exclusive right of our board of directors to elect a director to fill a vacancy created by the expansion of the board of directors or the resignation, death or removal of a director, which prevents stockholders from filling vacancies on our board of directors;
- the ability of our board of directors to authorize the issuance of shares of preferred stock and to determine the terms of those shares, including preferences and voting rights, without stockholder approval, which could be used to significantly dilute the ownership of a hostile acquirer;
- the ability of our board of directors to alter our bylaws without obtaining stockholder approval;
- the required approval of the holders of at least two-thirds of the shares entitled to vote at an election of directors to adopt, amend or repeal our bylaws or repeal the provisions of our amended and restated certificate of incorporation regarding the election and removal of directors;
- a prohibition on stockholder action by written consent, which forces stockholder action to be taken at an annual or special meeting of our stockholders;
- the requirement that a special meeting of stockholders may be called only by the chairman of the board of directors, our chief executive officer (or our president, in the absence of a chief executive officer) or a majority of our board of directors, which may delay the ability of our stockholders to force consideration of a proposal or to take action, including the removal of directors; and
- advance notice procedures that stockholders must comply with in order to nominate candidates to our board of directors or to propose matters to be acted upon at a stockholders' meeting, which may discourage or deter a potential acquirer from conducting a solicitation of proxies to elect the acquirer's own slate of directors or otherwise attempting to obtain control of us.

Moreover, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the General Corporation Law of the State of Delaware, which prohibits a person who owns in excess of 15% of our outstanding voting stock from merging or combining with us for a period of three years after the date of the transaction in which the person acquired in excess of 15% of our outstanding voting stock, unless the merger or combination is approved in a prescribed manner.

Our amended and restated certificate of incorporation provides that the Court of Chancery of the State of Delaware will be the exclusive forum for substantially all disputes between us and our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.

Our amended and restated certificate of incorporation provides that, unless we consent in writing to the selection of an alternative forum to the fullest extent permitted by law, the Court of Chancery of the State of Delaware will be the sole and exclusive forum for (1) any derivative action or proceeding brought on our behalf, (2) any action asserting a claim for breach of a fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders, (3) any action asserting a claim arising pursuant to any provision of the General Corporation Law of the State of Delaware, our amended and restated certificate of incorporation or our amended and restated bylaws, (4) any action to interpret, apply, enforce or determine the validity of our amended and restated certificate of incorporation or our amended and restated bylaws, or (5) any action asserting a claim governed by the internal affairs doctrine. Under our amended and restated certificate of incorporation, this exclusive forum provision will not apply to claims which are vested in the exclusive jurisdiction of a court or forum other than the Court of Chancery of the State of Delaware, or for which the Court of Chancery of the State of Delaware does not have subject matter jurisdiction. For instance, the provision would not apply to actions arising under federal securities laws, including suits brought to enforce any liability or duty created by the Exchange Act or the rules and regulations thereunder. This exclusive forum provision may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage such lawsuits against us and our directors, officers and other employees. For example, stockholders who do bring a claim in the Court of Chancery could face additional litigation costs in pursuing any such claim, particularly if they do not reside in or near the State of Delaware. The Court of Chancery may also reach different judgments or results than would other courts, including courts where a stockholder considering an action may be located or would otherwise choose to bring the action, and such judgments or results may be more favorable to us than to our stockholders.

We are an "emerging growth company," and the reduced disclosure requirements applicable to emerging growth companies may make our common stock less attractive to investors.

We are an "emerging growth company," as defined in the JOBS Act. We will remain an emerging growth company until the earlier of (1) the last day of the fiscal year in which we have total annual gross revenue of $1.07 billion or more, (2) the last day of the fiscal year following the fifth anniversary of the date of the completion of this offering, (3) the date on which we have issued more than $1.0 billion in nonconvertible debt during the previous three years, or (4) the date on which we are deemed to be a large accelerated filer under the rules of the SEC which means the market value of our common stock that is held by non-affiliates exceeds $700 million as of the prior June 30th. For so long as we remain an emerging growth company, we are permitted and intend to rely on exemptions from certain disclosure requirements that are applicable to other public companies that are not emerging growth companies. These exemptions include:

- being permitted to present only two years of audited financial statements and only two years of related "Management's discussion and analysis of financial condition and results of operations" disclosure in this prospectus;

- not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, as amended;
- not being required to comply with any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation or a supplement to the auditor's report providing additional information about the audit and the financial statements;
- reduced disclosure obligations regarding executive compensation in this prospectus and our periodic reports, proxy statements and registration statements; and
- exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved.

We have taken advantage of reduced reporting burdens in this prospectus. In particular, in this prospectus, we have provided only two years of audited financial statements and corresponding "Management's discussion and analysis of financial condition and results of operations" disclosure, and we have not included all of the executive compensation related information that would be required if we were not an emerging growth company. We cannot predict whether investors will find our common stock less attractive if we rely on these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may be reduced or more volatile. In addition, the JOBS Act provides that an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards. This allows an emerging growth company to delay the adoption of these accounting standards until they would otherwise apply to private companies. We have elected to take advantage of this extended transition period.

Special note regarding forward-looking statements

This prospectus contains forward-looking statements. All statements other than statements of present and historical facts contained in this prospectus, including statements regarding our future results of operations and financial position, business strategy, prospective products, planned preclinical or greenhouse studies and clinical or field trials, regulatory approvals, research and development costs, and timing and likelihood of success, as well as plans and objectives of management for future operations, may be forward-looking statements. Without limiting the foregoing, the words “anticipate,” “believe,” “could,” “expect,” “should,” “plan,” “intend,” “estimate,” “target,” “may,” “will,” “would,” “potential,” the negative thereof and similar words and expressions are intended to identify forward-looking statements.

Forward-looking statements are based on our management’s beliefs and assumptions and on information currently available to us. Such statements are subject to a number of known and unknown risks, uncertainties and assumptions, and actual results may differ materially from those expressed or implied in the forward-looking statements due to various factors, including, but not limited to, those identified under “Risk factors” and “Management’s discussion and analysis of financial condition and results of operations” and elsewhere in this prospectus. These risks and uncertainties include factors relating to:

- the initiation, cost, timing, progress and results of research and development activities, preclinical or greenhouse studies and clinical or field trials;
- our or our collaborators’ ability to identify, develop and commercialize product candidates;
- our or our collaborators’ ability to advance product candidates into, and successfully complete, clinical or field trials;
- the potential for off-target editing or other adverse events, undesirable side effects or unexpected characteristics associated with any of our product candidates;
- our or our collaborators’ ability to obtain and maintain regulatory approval of future product candidates, and any related restrictions, limitations and/or warnings in the label of an approved product candidate;
- the success of our existing collaboration agreements;
- our ability to enter into new collaboration arrangements;
- our ability to achieve our anticipated operating efficiencies as we commence manufacturing operations at our new facility;
- our ability to obtain funding for our operations;
- public perception about genome editing technology and its applications;
- our ability to obtain and maintain intellectual property protection for our technology and any of our product candidates;
- our or our collaborators’ ability to successfully commercialize any of our product candidates;
- the rate and degree of market acceptance of any of our product candidates;
- regulatory developments in the United States and international jurisdictions;
- competition in the genome editing, biopharmaceutical, biotechnology and agricultural biotechnology fields;
- potential manufacturing problems associated with any of our product candidates;

- potential liability lawsuits and penalties related to our technology, our product candidates and our current and future relationships with third parties;
- our ability to attract and retain key scientific and management personnel;
- our ability to effectively manage the growth of our operations;
- our ability to contract with third-party suppliers and manufacturers and their ability to perform adequately under those arrangements;
- our use of proceeds from this offering;
- our financial performance; and
- expected fluctuations of our stock price.

All forward-looking statements speak only as of the date of this prospectus, and except as required by applicable law, we do not plan to publicly update or revise any forward-looking statements contained herein, whether as a result of any new information, future events, changed circumstances or otherwise.

Industry and other data

We obtained the industry, statistical and market data in this prospectus from our own internal estimates and research as well as from industry and general publications and research, surveys and studies conducted by third parties. In some cases, we do not expressly refer to the sources from which this data is derived. In that regard, when we refer to one or more sources of this type of data in any paragraph, you should assume that other data of this type appearing in the same paragraph is derived from the same sources, unless otherwise expressly stated or the context otherwise requires. All of the market data used in this prospectus involves a number of assumptions and limitations, and you are cautioned not to give undue weight to such data. While we believe that each of these studies and publications is reliable, the industry in which we operate is subject to a high degree of uncertainty and risk due to a variety of important factors, including those described in “Risk factors.” These and other factors could cause results to differ materially from those expressed in the estimates made by third parties and by us.

Use of proceeds

We estimate that the net proceeds to us from the issuance and sale of shares of our common stock in this offering will be approximately $113.3 million, assuming an initial public offering price of $16.00 per share, which is the midpoint of the price range set forth on the cover page of this prospectus, after deducting the underwriting discounts and commissions and estimated offering expenses payable by us. If the underwriters' option to purchase additional shares from us is exercised in full, we estimate that our net proceeds will be approximately $130.9 million. Each $1.00 increase (decrease) in the assumed initial public offering price of $16.00 per share would increase (decrease) the net proceeds to us from this offering by approximately $7.3 million, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting the underwriting discounts and commissions and estimated offering expenses payable by us. Each increase (decrease) of 1.0 million in the number of shares we are offering would increase (decrease) the net proceeds to us from this offering by approximately $14.9 million, assuming that the assumed initial public offering price stays the same and after deducting the underwriting discounts and commissions and estimated offering expenses payable by us.

The principal purposes of this offering are to obtain additional capital to support our operations, to create a public market for our common stock and to facilitate our future access to the public equity markets. We anticipate that we will use the net proceeds from this offering as follows:

- approximately $7.0 to $9.0 million to initiate and complete a Phase 1/2a clinical trial for our CD19 CAR T cell product candidate;
- approximately $50.0 to $52.0 million to advance and expand the development of our other CAR T cell product candidates and allogeneic CAR T immunotherapy platform, including to submit an IND for each of our CD20, BCMA and CLL-1 CAR T cell product candidates;
- approximately $18.0 to $20.0 million to advance and expand the preclinical development of our *in vivo* gene correction platform, including early discovery efforts, chemistry, manufacturing and controls, or CMC, and IND-enabling studies;
- approximately $12.0 to $14.0 million to fund the build-out of our planned cGMP-compliant manufacturing facility; and
- the remainder to fund new and ongoing research and development activities, to fund the portion of expenses we are responsible for with respect to the development of our food platform and for working capital and other general corporate purposes.

This expected use of the net proceeds from this offering represents our intentions based upon our current plans and business conditions, which could change in the future as our plans and business conditions evolve. We may also use a portion of the net proceeds to in-license, acquire or invest in additional businesses, technologies, products or assets, although currently we have no specific agreements, commitments or understandings in this regard. As of the date of this prospectus, we cannot predict with certainty all of the particular uses for the net proceeds to be received upon the closing of this offering or the amounts that we will actually spend on the uses set forth above. Predicting the cost necessary to develop our technology and product candidates can be difficult, and we anticipate that we will need additional funds to complete our development programs. The amounts and timing of our actual expenditures and the extent of our preclinical studies and clinical trials and other development efforts may vary significantly depending on numerous factors, including the progress of our development efforts, the status of and results from preclinical studies and any clinical trials we may commence in the future, as well as any collaborations that we may enter into with third parties for our product candidates

and any unforeseen cash needs. As a result, our management will retain broad discretion over the allocation of the net proceeds from this offering.

Based on our current operating plan and planned use of the net proceeds from this offering and our existing cash and cash equivalents, we estimate that such funds will be sufficient to enable us to fund our operating expenses and capital expenditure requirements through 2020. We have based this estimate on assumptions that may prove to be incorrect, and we could use our available capital resources sooner than we currently expect. We may satisfy our future cash needs through the sale of equity securities, debt financings, working capital lines of credit, corporate collaborations or license agreements, grant funding, interest income earned on invested cash balances or a combination of one or more of these sources.

Pending our use of the net proceeds from this offering, we intend to invest the net proceeds in a variety of capital preservation investments, including short-term, investment-grade, interest-bearing instruments and U.S. government securities.

Dividend policy

We have never declared or paid any cash dividends on our capital stock. We intend to retain future earnings, if any, to finance the operation and expansion of our business and do not anticipate paying any cash dividends in the foreseeable future. Any future determination related to our dividend policy will be made at the discretion of our board of directors after considering our financial condition, results of operations, capital requirements, business prospects and other factors our board of directors deems relevant, and subject to any restrictions applicable to us contained in any future financing instruments.

Capitalization

The following table sets forth our cash and cash equivalents and capitalization as of December 31, 2018:

- on an actual basis;
- on a pro forma basis to reflect:
    - the automatic conversion of all outstanding shares of our convertible preferred stock into 22,301,190 shares of common stock upon the closing of this offering;
    - the receipt of approximately $39.6 million in cash proceeds from the sale of the 2019 Notes in March 2019;
    - the settlement of the 2019 Notes, including accrued interest, into 2,922,424 shares of our common stock and an aggregate charge to accumulated deficit of $7.2 million relating to the loss resulting from the change in fair value of the 2019 Notes from the issuance date through their settlement, assuming an initial public offering price per share of $16.00, which is the midpoint of the price range set forth on the cover page of this prospectus, in connection with the closing of this offering; and
    - the filing and effectiveness of our amended and restated certificate of incorporation, which will occur upon the closing of this offering; and
- on a pro forma as adjusted basis to give further effect to our issuance and sale of 7,900,000 shares of our common stock in this offering at an assumed initial public offering price of $16.00 per share, which is the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

The pro forma and pro forma as adjusted information below assumes we elect the fair value option to account for the 2019 Notes. Additionally, we have assumed for purposes of the pro forma and pro forma as adjusted information that the fair value of the 2019 Notes upon conversion is equal to $46.8 million, reflecting the 15% conversion discount provided to holders of the 2019 Notes, assuming an initial public offering price per share of $16.00, which is the midpoint of the price range set forth on the cover page of this prospectus. The loss resulting from the change between the $39.6 million aggregate principal amount of the 2019 Notes upon issuance and the assumed $46.8 million fair value of the 2019 Notes upon conversion, including accrued interest, is reflected as an increase in accumulated deficit in the pro forma and pro forma as adjusted amounts. The pro forma as adjusted information below is illustrative only, and our capitalization following the closing of this offering will be adjusted based on the actual initial public offering price and other terms of this offering determined at pricing. You should read this information in conjunction with our consolidated financial statements and the related notes included elsewhere in this prospectus and the “Management’s discussion and analysis of financial condition and results of operations” section and other financial information contained in this prospectus.

	As of December 31, 2018		
	Actual	Pro forma	Pro forma as adjusted(1)
(in thousands, except share and per share amounts)			
Cash and cash equivalents	$ 103,193	$ 142,743	$ 256,037
Convertible preferred stock, $0.0001 par value per share: 47,606,100 shares authorized, 22,301,190 shares issued and outstanding, actual; no shares authorized, issued or outstanding, pro forma and pro forma as adjusted	$ 5	$ —	$ —
Common stock, $0.000005 par value per share: 130,000,000 shares authorized, 16,717,117 shares issued and 15,906,645 shares outstanding, actual; 200,000,000 shares authorized, pro forma and pro forma as adjusted; 41,940,731 shares issued and 41,130,259 shares outstanding, pro forma; 49,840,731 shares issued and 49,030,259 shares outstanding, pro forma as adjusted	—	—	—
Preferred stock, $0.0001 par value per share: no shares authorized, issued and outstanding, actual; 10,000,000 shares authorized, pro forma and pro forma as adjusted; no shares issued and outstanding, pro forma and pro forma as adjusted	—	—	—
Additional paid-in capital	126,094	172,853	286,146
Accumulated deficit	(85,187)	(92,396)	(92,396)
Treasury stock	(952)	(952)	(952)
Total stockholders' equity	39,960	79,505	192,798
Total capitalization	$ 39,960	$ 79,505	$ 192,798

(1) Each $1.00 increase (decrease) in the assumed initial public offering price of $16.00 per share, which is the midpoint of the price range set forth on the cover page of this prospectus, would increase (decrease) the pro forma as adjusted amount of each of cash and cash equivalents, additional paid-in capital, total assets, total stockholders' equity and total capitalization by $7.3 million, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions. Similarly, each increase (decrease) of 1.0 million shares in the number of shares offered by us at the assumed initial public offering price per share of $16.00, which is the midpoint of the price range set forth on the cover page of this prospectus, would increase (decrease) the pro forma as adjusted amount of each of cash and cash equivalents, additional paid-in capital, total stockholders' equity and total capitalization by approximately $14.9 million, assuming the assumed initial public offering price per share remains the same and after deducting estimated underwriting discounts and commissions.

The number of shares of our common stock on a pro forma and pro forma as adjusted basis set forth in the table above is based on 15,906,645 shares of our common stock outstanding as of December 31, 2018 and does not include:

- 7,763,464 shares of common stock issuable upon exercise of stock options outstanding under our 2006 Plan and our 2015 Plan as of December 31, 2018, at a weighted-average exercise price of $5.00 per share;
- 4,750,000 shares of our common stock reserved for future issuance under our 2019 Incentive Award Plan, referred to as our 2019 Plan, which will become effective upon the effectiveness of the registration statement of which this prospectus forms a part, and from which we intend to grant options to purchase shares of our common stock having an aggregate value of $350,000 to one of our directors as more fully described in "Executive and Director Compensation—Director compensation—IPO grants to non-employee directors under the 2019 Plan," which number does not include any automatic increases in the number of shares of our common stock reserved for future issuance under our 2019 plan; and
- 525,000 shares of our common stock reserved for future issuance under our 2019 Employee Stock Purchase Plan, referred to as our 2019 ESPP, which will become effective upon the effectiveness of the registration statement of which this prospectus forms a part, which number does not include any automatic increases in the number of shares of our common stock reserved for future issuance under our 2019 ESPP.

Dilution

If you invest in our common stock in this offering, your ownership interest will be immediately diluted to the extent of the difference between the initial public offering price per share of our common stock and the pro forma as adjusted net tangible book value per share of our common stock after this offering.

As of December 31, 2018, we had a historical net tangible book value of $36.0 million, or $2.27 per share of common stock, based on 15,906,645 shares of common stock outstanding as of such date. Our historical net tangible book value per share represents total tangible assets less total liabilities, divided by the number of shares of our common stock outstanding as of December 31, 2018. We define net tangible book value as total assets less total liabilities, intangible assets and deferred offering costs. We define total tangible assets as total assets less intangible assets and deferred offering costs.

Our pro forma net tangible book value as of December 31, 2018 was $75.5 million, or $1.84 per share. Pro forma net tangible book value represents the amount of our total tangible assets less total liabilities, after giving effect to the automatic conversion of all shares of our convertible preferred stock outstanding as of December 31, 2018 into an aggregate of 22,301,190 shares of our common stock in connection with this offering, the receipt of $39.6 million in cash proceeds from the sale of the 2019 Notes in March 2019, the automatic settlement of the 2019 Notes, including accrued interest into 2,922,424 shares of our common stock and an aggregate charge to accumulated deficit of $7.2 million relating to the loss resulting from the change in fair value of the 2019 Notes from their issuance date through their settlement in connection with the closing of this offering, assuming an initial public offering price per share of $16.00, which is the midpoint of the price range set forth on the cover page of this prospectus. Pro forma net tangible book value per share represents our pro forma net tangible book value divided by the total number of shares outstanding as of December 31, 2018, after giving effect to the pro forma adjustment described above.

After giving further effect to the receipt of the net proceeds from our issuance and sale of 7,900,000 shares of common stock in this offering at an assumed initial public offering price of $16.00 per share, which is the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us, our pro forma as adjusted net tangible book value as of December 31, 2018 would have been approximately $188.8 million, or approximately $3.85 per share. This amount represents an immediate increase in pro forma net tangible book value of $2.01 per share to our existing stockholders and an immediate dilution of approximately $12.15 per share to new investors participating in this offering. We determine dilution by subtracting the pro forma as adjusted net tangible book value per share after this offering from the amount of cash that a new investor paid for a share of common stock. The following table illustrates this dilution:

Assumed initial public offering price per share		$16.00
Historical net tangible book value per share as of December 31, 2018	$ 2.27	
Pro forma decrease per share attributable to the issuance of the 2019 Notes, the conversion of our convertible preferred stock and settlement of the 2019 Notes	(0.43)	
Pro forma net tangible book value per share as of December 31, 2018	1.84	
Increase in the pro forma net tangible book value per share attributable to this offering	2.01	
Pro forma as adjusted net tangible book value per share after this offering		3.85
Dilution per share to new investors participating in this offering		$12.15

The dilution information discussed above is illustrative only and will change based on the actual initial public offering price and other terms of this offering determined at pricing. Each $1.00 increase (decrease) in the

assumed initial public offering price of $16.00 per share, which is the midpoint of the price range set forth on the cover page of this prospectus, would increase (decrease) the pro forma as adjusted net tangible book value per share after this offering by $0.15 per share. A $1.00 increase in the assumed initial public offering price would result in the dilution of the pro forma net tangible book value per share to new investors purchasing common stock in this offering of $13.00 per share, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions. A $1.00 decrease in the assumed initial public offering price would result in the dilution of pro forma net tangible book value per share of $11.30 per share, assuming that the number of shares offered by us remains the same and after deducting estimated underwriting discounts and commissions. An increase of 1.0 million shares in the number of shares offered by us would increase our pro forma as adjusted net tangible book value per share after this offering by $0.22 per share and decrease the dilution to new investors purchasing common stock in this offering to $11.93 per share, assuming the assumed initial public offering price remains the same and after deducting estimated underwriting discounts and commissions. A decrease of 1.0 million shares in the number of shares offered by us would decrease our pro forma as adjusted net tangible book value per share after this offering by ($0.23) per share and increase the dilution to new investors purchasing common stock in this offering to $12.38 per share, assuming the assumed initial public offering price remains the same and after deducting estimated underwriting discounts and commissions.

If the underwriters exercise their option to purchase additional shares of our common stock in full, the pro forma as adjusted net tangible book value per share after this offering would be $4.11 per share, and the dilution per share to new investors would be $11.89 per share, in each case based on the initial public offering price of $16.00 per share, after deducting estimated underwriting discounts and commissions and the estimated offering expenses payable by us.

The following table summarizes, as of December 31, 2018, on the pro forma as adjusted basis described above, the total number of shares of common stock purchased from us on an as converted to common stock basis, the total consideration paid or to be paid and the average price per share paid or to be paid by existing stockholders and by new investors in this offering at an assumed initial public offering price of $16.00 per share, which is the midpoint of the price range set forth on the cover page of this prospectus, before deducting the underwriting discounts and commissions and estimated offering expenses payable by us. As the table shows, new investors purchasing common stock in this offering will pay an average price per share substantially higher than our existing stockholders paid.

	Shares purchased		Total consideration		Average price per share
	Number	Percent	Amount	Percent	
Existing stockholders	41,130,259	83.9%	$163,033,474	56.3%	$ 3.96
New investors	7,900,000	16.1	126,400,000	43.7	16.00
Total	49,030,259	100.0%	$289,433,474	100.0%	

If the underwriters exercise their option to purchase additional shares of our common stock in full, the percentage of shares of common stock held by existing stockholders will decrease to approximately 81.9% of the total number of shares of our common stock outstanding after this offering, and the number of shares held by new investors will increase to 9,085,000, or approximately 18.1% of the total number of shares of our common stock outstanding after this offering.

A $1.00 increase or decrease in the assumed initial public offering price of $16.00 per share, which is the midpoint of the price range set forth on the cover page of this prospectus, would increase or decrease the total consideration paid by new investors by $7.9 million and, in the case of an increase, would increase the percentage of total consideration paid by new investors by 1.5% and, in the case of a decrease, would decrease

the percentage of total consideration paid by new investors by 1.6%, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same. An increase or decrease of 1.0 million shares in the number of shares offered by us, as set forth on the cover page of this prospectus, would increase or decrease the total consideration paid by new investors by $16.0 million and, in the case of an increase, would increase the percentage of total consideration paid by new investors by 3.0% and, in the case of a decrease, would decrease the percentage of total consideration paid by new investors by 3.3%, assuming the assumed initial public offering price per share remains the same and after deducting the underwriting discounts and commissions.

The foregoing tables and calculations (other than the historical net tangible book value calculation) are based on the number of shares of our common stock outstanding as of December 31, 2018, after giving effect to the automatic conversion of all outstanding shares of our convertible preferred stock into common stock and the automatic settlement of the 2019 Notes into shares of our common stock in connection with this offering, and exclude:

- 7,763,464 shares of common stock issuable upon exercise of stock options outstanding under our 2006 Plan and our 2015 Plan as of December 31, 2018, at a weighted-average exercise price of $5.00 per share;
- 4,750,000 shares of our common stock reserved for future issuance under our 2019 Incentive Award Plan, referred to as our 2019 Plan, which will become effective upon the effectiveness of the registration statement of which this prospectus forms a part, and from which we intend to grant options to purchase shares of our common stock having an aggregate value of $350,000 to one of our directors as more fully described in “Executive and Director Compensation—Director compensation—IPO grants to non-employee directors under the 2019 Plan,” which number does not include any automatic increases in the number of shares of our common stock reserved for future issuance under our 2019 plan; and
- 525,000 shares of our common stock reserved for future issuance under our 2019 Employee Stock Purchase Plan, referred to as our 2019 ESPP, which will become effective upon the effectiveness of the registration statement of which this prospectus forms a part, which number does not include any automatic increases in the number of shares of our common stock reserved for future issuance under our 2019 ESPP.

To the extent that these outstanding stock options are exercised, new stock options are issued or we issue additional shares of common stock in the future, there will be further dilution to new investors. In addition, we may choose to raise additional capital because of market conditions or strategic considerations, even if we believe that we have sufficient funds for our current or future operating plans. If we raise additional capital through the sale of equity or convertible debt securities, the issuance of these securities could result in further dilution to our stockholders.

Selected consolidated financial data

You should read the following selected consolidated financial data together with our consolidated financial statements and the related notes included elsewhere in this prospectus and "Management's discussion and analysis of financial condition and results of operations." We have derived the consolidated statement of operations data for the years ended December 31, 2017 and 2018 and the consolidated balance sheet data as of December 31, 2017 and 2018 from our audited consolidated financial statements included elsewhere in this prospectus. Our historical results are not necessarily indicative of the results that should be expected in any future period.

	Years ended December 31,	
(in thousands, except share and per share data)	**2017**	**2018**
Consolidated Statements of Operations Data:		
Revenue	$ 6,484	$ 10,883
Operating expenses:		
Research and development	20,324	45,122
General and administrative	8,016	13,673
Impairment of intangible assets	118	—
Total operating expenses	28,458	58,795
Loss from operations	(21,974)	(47,912)
Other income:		
Interest income	872	1,875
Net loss and net loss attributable to common stockholders—basic and diluted	$ (21,102)	$ (46,037)
Net loss per share attributable to common stockholders—basic and diluted	$ (1.33)	$ (2.92)
Weighted-average shares of common stock outstanding—basic and diluted(1)	15,906,793	15,775,541
Pro forma net loss per share attributable to common stockholders—basic and diluted (unaudited) (1)		$ (1.37)
Pro forma weighted-average shares of common stock outstanding—basic and diluted (unaudited) (1)		33,653,835

(1) See Note 10 to our audited consolidated financial statements included elsewhere in this prospectus for an explanation of the method used to calculate the historical basic and diluted net loss per share of common stock and the weighted-average number of shares used in the computation of the per share amounts.

	As of December 31,	
(in thousands)	**2017**	**2018**
Consolidated Balance Sheet Data:		
Cash and cash equivalents	$ 62,802	$ 103,193
Working capital(1)	55,129	101,600
Total assets	72,682	138,600
Total liabilities	99,051	98,640
Accumulated deficit	(39,111)	(85,187)
Stockholders' (deficit) equity	(26,369)	39,960

(1) We define working capital as current assets less current liabilities. See our consolidated financial statements included elsewhere in this prospectus for further details regarding our current assets and current liabilities.

Management's discussion and analysis of financial condition and results of operations

You should read the following discussion and analysis of financial condition and operating results together with the section captioned "Selected consolidated financial data" and our consolidated financial statements and the related notes included elsewhere in this prospectus. This discussion contains forward-looking statements that involve risks and uncertainties. As a result of many factors, such as those set forth in the section of the prospectus captioned "Risk factors" and elsewhere in this prospectus, our actual results may differ materially from those anticipated in these forward-looking statements.

Overview

We are a genome editing company dedicated to improving life through our groundbreaking proprietary genome editing platform, "ARCUS." We leverage ARCUS in the development of our product candidates, which are designed to treat human diseases and create healthy and sustainable food and agricultural solutions. We believe the versatility and breadth of ARCUS support our ability to develop products across the spectrum of biotechnology. We are actively developing product candidates in three innovative and high value areas where we believe our technology has the potential to overcome the limitations of other genome editing technologies: allogeneic CAR T immunotherapy, *in vivo* gene correction, and food. The U.S. Food and Drug Administration, or FDA, recently accepted our investigational new drug, or IND, application for our first gene-edited allogeneic CAR T cell candidate targeting CD19. We are currently screening patients for our planned Phase 1/2a clinical trial in patients with relapsed or refractory, or R/R, B-cell precursor acute lymphoblastic leukemia and R/R non-hodgkin lymphoma and expect to dose our first patient in this trial in April 2019. We believe this trial will be the first clinical investigation of an allogeneic CAR T therapy for non-hodgkin lymphoma. We believe our proprietary, one-step engineering process for producing allogeneic CAR T cells at large scale in a cost-effective manner will enable us to overcome the fundamental challenges of manufacturing that have limited the CAR T field to date.

Since our formation in 2006, we have devoted substantially all of our resources to developing ARCUS, conducting research and development activities, recruiting skilled personnel, developing manufacturing processes, establishing our intellectual property portfolio and providing general and administrative support for these operations. We have financed our operations primarily with proceeds from the sale of our convertible preferred stock and upfront payments from licensing arrangements. To date, we have generated approximately $317 million from third parties through a combination of preferred stock and convertible note financings, an upfront payment under the Servier Agreement and additional funding from other strategic alliances and grants. In March 2019, we sold and issued approximately $39.6 million aggregate principal amount of convertible promissory notes, or the 2019 Notes, in a private placement transaction.

Since our inception, we have incurred significant operating losses and have not generated any revenue from the sale of products. Our ability to generate any product revenue or product revenue sufficient to achieve profitability will depend on the successful development and eventual commercialization of one or more of our product candidates or the product candidates of our collaborators for which we may receive milestone payments or royalties. Our net losses were $21.1 million and $46.0 million for the years ended December 31, 2017 and 2018, respectively. As of December 31, 2018, we had an accumulated deficit of $85.2 million.

We expect our operating expenses to increase substantially in connection with the expansion of our product development programs and capabilities. We will not generate revenue from product sales unless and until we successfully complete clinical development and obtain regulatory approval for one of our product candidates or the product candidates of our collaborators for which we may receive milestone payments or royalties. If we obtain regulatory approval for any of our product candidates, we expect to incur significant expenses related to

developing our commercialization capability to support product sales, marketing and distribution. In addition, following the closing of this offering, we expect to incur additional costs associated with operating as a public company.

As a result of these anticipated expenditures, we will need additional financing to support our continuing operations. Until such time as we can generate significant revenue from product sales, if ever, we expect to finance our cash needs through a combination of public or private equity or debt financings or other sources, which may include current and new collaborations with third parties. Adequate additional financing may not be available to us on acceptable terms, or at all. Our inability to raise capital as and when needed would have a negative impact on our financial condition and our ability to pursue our business strategy. We cannot assure you that we will ever generate significant revenue to achieve profitability.

Because of the numerous risks and uncertainties associated with the development of therapeutic and agricultural products, we are unable to predict the timing or amount of increased expenses or when or if we will be able to achieve or maintain profitability. Even if we are able to generate revenue from product sales, we may not become profitable. If we fail to become profitable or are unable to sustain profitability on a continuing basis, then we may be required to raise additional capital on terms that are unfavorable to us or we may be unable to continue our operations at planned levels and be forced to reduce or terminate our operations.

We currently conduct our operations through two reportable segments: Therapeutics and Food. Our Therapeutics segment is focused on allogeneic CAR T immunotherapy and *in vivo* gene correction. Our Food segment focuses on applying ARCUS to develop food and nutrition products through collaboration agreements with consumer-facing companies.

Collaborations

Gilead

In September 2018, we and Gilead entered into a collaboration and license agreement, which we refer to as the Gilead Agreement, to develop genome editing tools using ARCUS to target viral DNA associated with the Hepatitis B virus. Pursuant to the terms of the agreement, Gilead received an exclusive license to exploit the resulting synthetic nucleases and products that use them to treat the Hepatitis B virus in humans, and we are entitled to receive up to approximately $40 million in research funding over an initial three year term and milestone payments of up to an aggregate of $445 million, consisting of up to $105.0 million in development milestone payments and up to $340.0 million in commercial milestone payments. We are also entitled to receive tiered royalties ranging from the high single digit percentages to the mid-teen percentages on worldwide net sales of the products developed through the term of the agreement, subject to customary potential reductions.

We recognized $3.7 million in revenues under the Gilead Agreement during the year ended December 31, 2018 and recorded $2.3 million in deferred revenue as of December 31, 2018. We did not receive any milestone payments under the Gilead Agreement during the year ended December 31, 2018.

Servier

In February 2016, we entered into the Servier Agreement, pursuant to which we have agreed to develop allogeneic chimeric antigen receptor T cell therapies for up to six unique antigen targets. One target was selected at the agreement's inception, and Servier is entitled to select the remaining five targets over the first four years of the agreement. Upon selection of an antigen target under the agreement, we have agreed to perform early-stage research and development on individual T cell modifications for the selected target, develop the resulting therapeutic product candidates through Phase 1 clinical trials and prepare clinical supply of such product candidates for use in Phase 2 clinical trials.

We received an upfront payment of $105.0 million under the Servier Agreement. We have the ability to receive total payments, including the upfront payment, option fees and milestone payments, in the aggregate across all six targets, of up to approximately $1.6 billion. This includes up to $1.5 billion in milestone payments, consisting of up to $401.3 million in development milestone payments and up to $1.1 billion in commercial milestone payments. We are also entitled to receive tiered royalties ranging from the mid-single digit percentages to the sub-teen percentages on worldwide net sales, subject to potential customary reductions. We also have the right to participate in the development and commercialization of any licensed products resulting from the collaboration through a 50/50 co-development and co-promotion option in the United States, subject to our payment of an option fee, which is exercisable after Servier's commercial option exercise.

We recognized $5.8 million in revenues under the Servier Agreement during each of the years ended December 31, 2017 and 2018. The amount recorded as deferred revenue was $94.4 million and $88.6 million as of December 31, 2017 and 2018, respectively. No development or sales-based milestones were received for the fiscal years ended December 31, 2017 and 2018.

Components of our results of operations

Revenue

To date, we have not generated any revenue from product sales and do not expect to generate any revenue from product sales in the foreseeable future. We record revenue from collaboration agreements, including amounts related to upfront payments, annual fees for licenses of our intellectual property and research and development funding.

Research and development expenses

Research and development expenses consist primarily of costs incurred for our research activities, including our discovery efforts and the development of our product candidates. These include the following:

- salaries, benefits and other related costs, including stock-based compensation expense, for personnel engaged in research and development functions;
- expenses incurred under agreements with third parties, including CROs and other third parties that conduct preclinical research and development activities and clinical trials on our behalf;
- costs of developing and scaling our manufacturing process and manufacturing drug products for use in our preclinical studies and future clinical trials, including the costs of CMOs that will manufacture our clinical trial material for use in our preclinical studies and potential future clinical trials;
- costs of outside consultants, including their fees and related travel expenses;
- costs of laboratory supplies and acquiring, developing and manufacturing preclinical study and clinical trial materials;
- license payments made for intellectual property used in research and development activities; and
- facility-related expenses, which include direct depreciation costs and expenses for rent and maintenance of facilities and other operating costs if specifically identifiable to research activities.

We expense research and development costs as incurred.

We track external research and development costs, including the costs of laboratory supplies and services, outsourced research and development, clinical trials, contract manufacturing, laboratory equipment and

maintenance and certain other development costs, by product candidate when the costs are specifically identifiable to a product candidate. Internal and external costs associated with infrastructure resources, other research and development costs, facility related costs and depreciation and amortization that are not identifiable to a specific product candidate are included in the platform development, early-stage research and unallocated expenses category in the table below.

The following table summarizes our research and development expenses by product candidate or development program:

	Years ended December 31,		
	2017	2018	Increase
(in thousands)			
Direct research and development expenses by product candidate:			
CD19 external development costs	$ 3,844	$13,654	$ 9,810
Platform development, early-stage research and unallocated expenses:			
Employee-related costs	9,878	14,784	4,906
Laboratory supplies and services	2,183	4,061	1,878
Outsourced research and development	1,455	7,055	5,600
Laboratory equipment and maintenance	324	519	195
Facility-related costs	832	1,431	599
Depreciation and amortization	1,205	1,759	554
Other research and development costs	603	1,859	1,256
Total research and development expenses	$20,324	$45,122	$ 24,798

Research and development activities are central to our business model. We expect that our research and development expenses will continue to increase substantially for the foreseeable future and will comprise a larger percentage of our total expenses as we initiate a Phase 1/2a clinical trial for our CD19 product candidate and continue to discover and develop additional product candidates.

We cannot determine with certainty the duration and costs of future clinical trials of our CD19 product candidate or any other product candidate we may develop or if, when or to what extent we will generate revenue from the commercialization and sale of any product candidate for which we obtain marketing approval. We may never succeed in obtaining marketing approval for any product candidate. The duration, costs and timing of clinical trials and development of our CD19 product candidate and any other our product candidate we may develop will depend on a variety of factors, including:

- the scope, rate of progress, expense and results of clinical trials of our CD19 product candidate, as well as of any future clinical trials of other product candidates and other research and development activities that we may conduct;
- uncertainties in clinical trial design and patient enrollment rates;
- the actual probability of success for our product candidates, including their safety and efficacy, early clinical data, competition, manufacturing capability and commercial viability;
- significant and changing government regulation and regulatory guidance;
- the timing and receipt of any marketing approvals; and
- the expense of filing, prosecuting, defending and enforcing any patent claims and other intellectual property rights.

A change in the outcome of any of these variables with respect to the development of a product candidate could mean a significant change in the costs and timing associated with the development of that product candidate.
For example, if the FDA or another regulatory authority were to require us to conduct clinical trials beyond
those that we anticipate will be required for the completion of clinical development of a product candidate, or if we experience significant delays in our clinical trials due to slower than expected patient enrollment or other reasons, we would be required to expend significant additional financial resources and time on the completion of clinical development.

General and administrative expenses

General and administrative expenses consist primarily of salaries and other related costs, including stock-based compensation, for personnel in our executive, finance, business development, operations and administrative functions. General and administrative expenses also include legal fees relating to intellectual property and corporate matters; professional fees for accounting, auditing, tax and consulting services; insurance costs; travel expenses; and facility-related expenses, which include direct depreciation costs and expenses for rent and maintenance of facilities and other operating costs that are not specifically attributable to research activities.

We expect that our general and administrative expenses will increase in the future as we increase our personnel headcount to support our continued research activities and development of product candidates. Following this offering, we also expect to incur increased expenses associated with being a public company, including costs of accounting, audit, legal, regulatory and tax-related services associated with maintaining compliance with Nasdaq and SEC requirements; director and officer insurance costs; and investor and public relations costs.

Interest income

Interest income consists of interest income earned on our cash and cash equivalents.

Income taxes

Since our inception in 2006, we have generated cumulative federal and state net operating loss and R&D credit carryforwards for which we have not recorded any net tax benefit due to the uncertainty around utilizing these tax attributes within their respective carryforward periods. As of December 31, 2018, we had federal and state net operating loss carryforwards of $40.0 million and $39.8 million, respectively, which may be available to offset future taxable income. The U.S. federal net operating loss carryforwards of $19.4 million will begin to expire in 2030 while the remaining federal net operating loss carryforwards of $20.6 million carry forward indefinitely. The state net operating loss carryforwards begin to expire in 2025, As of December 31, 2018, we also had federal research and development tax credit carryforwards of $3.6 million, which begin to expire in 2027. As of December 31, 2018, we also have federal contribution carryforwards of less than $0.1 million, which begin to expire in 2020. We have recorded a full valuation allowance against our net deferred tax assets at each balance sheet date.

On December 22, 2017, the Tax Cuts and Jobs Act was signed into United States law. The Tax Cuts and Jobs Act includes a number of changes to existing tax law, including, among other things, a permanent reduction in the federal corporate income tax rate from a top marginal tax rate of 35% to a flat rate of 21%, effective as of January 1, 2018, as well as a limitation of the deduction for net operating losses to 80% of annual taxable income and elimination of net operating loss carrybacks, in each case, for losses arising in taxable years beginning after December 31, 2017 (though any such net operating losses may be carried forward indefinitely). The federal tax rate change resulted in a reduction in the gross amount of our deferred tax assets and liabilities

recorded as of December 31, 2017, and a corresponding reduction in our valuation allowance. As a result, no income tax expense or benefit was recognized as of the enactment date of the Tax Cuts and Jobs Act.

Results of operations

Comparison of years ended December 31, 2017 and 2018

The following table summarizes our results of operations for the years ended December 31, 2017 and 2018, together with the changes in those items in dollars:

	Years ended December 31,		
	2017	2018	Change
(in thousands)			
Revenue	$ 6,484	$ 10,883	$ 4,399
Operating expenses:			
Research and development	20,324	45,122	24,798
General and administrative	8,016	13,673	5,657
Impairment of intangible assets	118	—	(118)
Total operating expenses	28,458	58,795	30,337
Loss from operations	(21,974)	(47,912)	(25,938)
Other income:			
Interest income	872	1,875	1,003
Net loss	$ (21,102)	$ (46,037)	$ (24,935)

Revenue

Revenue for the year ended December 31, 2017 was $6.5 million, compared to $10.9 million for the year ended December 31, 2018. The increase of $4.4 million in revenue during the year ended December 31, 2018 was generally the result of increases in research funding of $3.7 million from Gilead and of $1.0 million from another joint development collaboration partner, which was partially offset by a $0.3 million decrease in license fees from a biopharmaceutical manufacturer and a $0.1 million decrease in license fees from a collaboration partner.

Research and development expenses

	Years ended December 31,		
	2017	2018	Increase
(in thousands)			
Direct research and development expenses by product candidate:			
CD19 external development costs	$ 3,844	$13,654	$ 9,810
Platform development, early-stage research and unallocated expenses:			
Employee-related costs	9,878	14,784	4,906
Laboratory supplies and services	2,183	4,061	1,878
Outsourced research and development	1,455	7,055	5,600
Laboratory equipment and maintenance	324	519	195
Facility-related costs	832	1,431	599
Depreciation and amortization	1,205	1,759	554
Other research and development costs	603	1,859	1,256
Total research and development expenses	$20,324	$45,122	$ 24,798

Research and development expenses for the year ended December 31, 2017 were $20.3 million, compared to $45.1 million for the year ended December 31, 2018. The increase of $24.8 million was primarily due to increases of $9.8 million in direct research and development expenses related to our CD19 program and $15.0 million in platform development and early-stage research expenses. Our CD19 program incurred expenditure increases of $7.3 million to CMOs for clinical trial material, $0.7 million to CROs for clinical trial costs, $0.8 million in lab services, $0.4 million in scientific service providers, and $0.6 million in other costs. Platform development and early-stage research expenses increased primarily due to a $5.6 million increase in outsourced research and development spending on our development programs, excluding our CD19 program, and $4.9 million of additional employee-related cost associated with increased headcount to support our technology platform development and manufacturing capabilities.

General and administrative expenses

General and administrative expenses were $8.0 million for the year ended December 31, 2017, compared to $13.7 million for the year ended December 31, 2018. The increase of $5.7 million was primarily due to an increase of $3.0 million in employee-related costs as we increased our general and administrative headcount. General and administrative expenses also increased due to costs required to meet our growing infrastructure needs. Contributing to the increase were $0.5 million in facility related costs, including equipment, $1.1 million in consulting fees, $0.5 million in information technology costs, and $0.3 million in depreciation and amortization.

Interest income

Interest income was $0.9 million for the year ended December 31, 2017 compared to $1.9 million for the year ended December 31, 2018. The increase of $1.0 million of interest income generated on our cash and cash equivalent balances for the year ended December 31, 2018 compared to the year ended December 31, 2017 was the result of higher interest rates and having higher cash balances invested in 2018 compared to 2017.

Segment results

The following tables summarize segment revenues and segment operating loss for the years ended December 31, 2017 and 2018 (see Note 14 to our audited consolidated financial statements included elsewhere in this prospectus for additional information regarding our segments):

	Years ended December 31,	
	2017	2018
(in thousands)		
Revenue:		
Therapeutics	$ 6,064	$ 9,523
Food	420	1,360
Total segment revenue	6,484	10,883
Segment operational cash expenditures:		
Therapeutics	$ 11,062	$ 35,045
Food	1,699	9,125
Total segment operational cash expenditures	12,761	44,170
Allocation of centralized research and development operational cash expenditures:		
Therapeutics	$ 6,948	$ 11,605
Food	1,164	2,901
Total allocation of centralized research and development operational cash expenditures	8,112	14,506
Segment operating income (loss):		
Therapeutics	$ (11,946)	$ (37,127)
Food	(2,443)	(10,666)
Total segment operating loss	(14,389)	(47,793)

We evaluate the operating performance of each segment based on segment operating loss. Segment operating loss is derived by deducting operational cash expenditures from revenue. Operational cash expenditures are cash disbursements made that are specifically identifiable to the reportable segment (including specifically identifiable research and development and property, equipment and software expenditures) plus an allocation of centralized research and development expenditures for early stage research, nuclease development and the purchase of general laboratory supplies. These expenditures are allocated to the segments based on headcount. The reportable segment and centralized research and development operational cash expenditures include cash disbursements for compensation, lab supplies, purchases of property, equipment and software and procuring services from CROs, CMOs and research organizations. We do not allocate general operational expenses or non-cash income statement amounts to our reportable segments.

Therapeutics segment

Revenue for the year ended December 31, 2017 was $6.1 million, compared to $9.5 million for the year ended December 31, 2018. The increase of $3.4 million was attributable to a $3.7 million increase in research funding received from Gilead, which was partially offset by a $0.3 million decrease in license fees from a biopharmaceutical manufacturer.

Segment operational cash expenditures for the year ended December 31, 2017 were $11.1 million, compared to $35.0 million for the year ended December 31, 2018. The increase of $23.9 million was primarily due to an

increase in payments made to service providers for research and development, contract manufacturing, clinical trial research, lab supplies and services, and an increase in employee headcount and related costs. Segment operating loss increased $25.2 million from $11.9 million for the year ended December 31, 2017 to $37.1 million for the year ended December 31, 2018 primarily due to the factors discussed above.

Food segment

Revenue for the year ended December 31, 2017 was $0.4 million, compared to $1.4 million for the year ended December 31, 2018. The increase of $0.9 million was primarily attributable to an increase in research funding of $1.0 million from another joint development collaboration partner.

Segment operational cash expenditures for the year ended December 31, 2017 were $1.7 million, compared to $9.1 million for the year ended December 31, 2018. The increase of $7.4 million was primarily due to an increase in leasehold improvements, equipment and lab supply expenditures and employee headcount and related costs. Segment operating loss increased $8.3 million from $2.4 million for the year ended December 31, 2017 to $10.7 million for the year ended December 31, 2018 primarily due to the factors discussed above.

Liquidity and capital resources

Since our inception, we have incurred significant operating losses. We expect to incur significant expenses and operating losses for the foreseeable future as we advance the preclinical and clinical development of our product candidates. We expect that our research and development and general and administrative costs will continue to increase, including in connection with conducting preclinical studies and clinical trials for our product candidates, contracting with CMOs and building out internal capacity to have product manufactured to support preclinical studies and clinical trials, expanding our intellectual property portfolio and providing general and administrative support for our operations. As a result, we will need additional capital to fund our operations, which we may obtain from additional equity or debt financings, collaborations, licensing arrangements or other sources.

We do not currently have any approved products and have never generated any revenue from product sales. To date, we have financed our operations primarily with proceeds from the sale of our convertible preferred stock and upfront payments from licensing arrangements. To date, we have generated approximately $317 million from third parties through a combination of preferred stock and convertible note financings, an upfront payment under the Servier Agreement and additional funding from other strategic alliances and grants.

Cash flows

Our cash and cash equivalents totaled $103.2 million as of December 31, 2018. We had no indebtedness as of December 31, 2018.

The following table summarizes our sources and uses of cash for the periods presented:

	Years ended December 31,	
	2017	**2018**
(in thousands)		
Net cash used in operating activities	$ (24,169)	$ (51,723)
Net cash used in investing activities	(5,515)	(15,663)
Net cash (used in) provided by financing activities	(937)	107,777
Increase (decrease) in cash and cash equivalents	$ (30,621)	$ 40,391

Cash flows for the year ended December 31, 2018

Operating activities

Net cash used in operating activities for the year ended December 31, 2018 was $51.7 million, primarily consisting of our net loss of $46.0 million as we incurred expenses associated with our CD19 program, platform development and early-stage research and general and administrative expenses. In addition, we had non-cash charges of $4.8 million for depreciation and stock-based compensation expense. Net cash used in operating activities was also impacted by $10.5 million in changes in operating assets and liabilities, including $7.5 million in prepaid expenses, $3.2 million in deferred revenue, $0.5 million in accounts receivable, $0.7 million in accounts payable and $0.4 million in other current assets and other assets, which were partially offset by changes of $1.8 million in accrued expenses.

Investing activities

Net cash used in investing activities for the year ended December 31, 2018 was $15.7 million, which was attributable to purchases of property, equipment and software of $14.3 million and the acquisition of intellectual property of $1.4 million.

Financing activities

Net cash provided in financing activities for the year ended December 31, 2018 was $107.8 million, consisting of the net proceeds from the issuance of our Series B convertible preferred stock financing of $109.7 million, net of offering costs, and $0.2 million in proceeds from stock option exercises, partially offset by $2.1 million in payments for deferred offering costs associated with our planned initial public offering.

Cash flows for the year ended December 31, 2017

Operating activities

Net cash used in operating activities for the year ended December 31, 2017 was $24.2 million, primarily consisting of our net loss of $21.1 million as we incurred expenses associated with research activities on our CD19 program and research activities on other applications for our technology and incurred general and administrative expenses. In addition, we had a loss of $0.1 million on the disposal of assets and non-cash charges of $2.0 million for depreciation and stock-based compensation expense and the impairment of intangible assets. Net cash used in operating activities was also impacted by $5.1 million in changes in operating assets and liabilities, including $6.2 million in deferred revenue and $0.6 million in prepaid expenses and other current assets, partially offset by changes of $0.9 million in accounts payable, $0.7 million in accrued expenses and other current liabilities and $0.1 million in other assets.

Investing activities

Net cash used in investing activities for the year ended December 31, 2017 was $5.5 million, which was attributable to purchases of property, equipment and software of $5.6 million, partially offset by $0.1 million from the proceeds from the disposal of equipment.

Financing activities

Net cash used in financing activities for the year ended December 31, 2017 was $0.9 million, consisting of repurchases of common stock of $1.0 million, partially offset by less than $0.1 million in proceeds from stock option exercises.

Funding requirements

Our operating expenses have increased substantially in 2017 and 2018 and are expected to increase substantially in 2019 and in the future in connection with our ongoing activities, particularly as we advance our preclinical activities including pre-IND enabling studies, scale-up of manufacturing processes and engagement with CMOs and initiation of human clinical trials. In addition, following the closing of this offering, we expect to incur additional costs associated with operating as a public company.

Specifically, our costs and expenses will increase as we:

- pursue the clinical development of our CD19 program;
- pursue the preclinical and clinical development of our other CAR T cell product candidates and allogeneic CAR T immunotherapy platform, our gene correction platform and our other product candidates;
- further scale up our internal manufacturing processes and capabilities and contract with CMOs to support our preclinical studies and clinical trials of our product candidates and make other capital expenditures to support our operations;
- in-license or acquire the rights to other products, product candidates or technologies;
- maintain, expand and protect our intellectual property portfolio;
- hire additional personnel in research, manufacturing and regulatory and clinical development as well as management personnel; and
- expand our operational, financial and management systems and increase personnel, including personnel to support our operations as a public company.

We believe that the anticipated net proceeds from this offering, together with our existing cash and cash equivalents, will enable us to fund our operating expenses and capital expenditure requirements through 2020. We have based these estimates on assumptions that may prove to be imprecise, and we could utilize our available capital resources sooner than we expect.

Because of the numerous risks and uncertainties associated with research, development and commercialization of pharmaceutical and agricultural products, it is difficult to estimate with certainty the amount of our working capital requirements. Our future funding requirements will depend on many factors, including:

- the progress, costs and results of our clinical development and initial clinical trials for our CD19 program;
- the progress, costs and results of our additional research and preclinical development programs;
- the outcome, timing and cost of meeting regulatory requirements established by the FDA and other comparable foreign regulatory authorities;
- the costs and timing of internal process development and manufacturing scale-up activities and contract with CMOs associated with our CD19 program and other programs we advance through preclinical and clinical development;
- our ability to establish and maintain strategic collaborations, licensing or other agreements and the financial terms of such agreements;
- the scope, progress, results and costs of any product candidates that we may derive from ARCUS or any other product candidates we may develop alone or with collaborators;

- the extent to which we in-license or acquire rights to other products, product candidates or technologies;
- the costs and timing of preparing, filing and prosecuting patent applications, maintaining and protecting our intellectual property rights and defending against any intellectual property-related claims; and
- the costs and timing of future commercialization activities, including product manufacturing, marketing, sales and distribution, for any product candidates for which we or our collaborators obtain marketing approval.

Until such time, if ever, that we can generate product revenue sufficient to achieve profitability, we expect to finance our cash needs through a combination of public or private equity or debt financings, collaboration agreements, other third-party funding, strategic alliances, licensing arrangements and marketing and/or distribution arrangements.

To the extent that we raise additional capital through the sale of equity or convertible debt securities, your ownership interest will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect your rights as a common stockholder. Debt financing and preferred equity financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends. If we raise additional funds through other third-party funding, collaboration agreements, strategic alliances, licensing arrangements or marketing and distribution arrangements, we may have to relinquish valuable rights to our technologies, future revenue streams, product development and research programs or product candidates or grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds through equity or debt financings when needed, we may be required to delay, limit, reduce or terminate our product development or future commercialization efforts or grant rights to develop and market products or product candidates that we would otherwise prefer to develop and market ourselves.

Contractual obligations and commitments

The following is a summary of our contractual obligations and commitments as of December 31, 2018:

		Payments due by period			
	Total	Less than 1 year	1—3 years	3-5 years	More than 5 years
(in thousands)					
Operating lease obligation(1)	$14,530	$ 1,999	$4,384	$4,663	$ 3,484

(1) Represents future minimum lease payments under our operating leases for office and/or lab space at the following locations: 302 East Pettigrew Street, Durham, North Carolina expiring in July 2024, 5 Laboratory Drive, Research Triangle Park, North Carolina expiring in April 2026 and 20 TW Alexander Drive, Research Triangle Park, North Carolina expiring in August 2026 (see Note 9 to our consolidated financial statements included elsewhere in this prospectus for additional information on these lease agreements).

In addition, we have entered into the Duke License, under which we are obligated to make aggregate future milestone payments of up to $0.2 million upon the achievement of specified corporate milestones as well as low-single digit percent royalty payments based on future net sales of applicable products and generally mid-teen percent royalties based on sublicensing revenue. See “Business—License and collaboration agreements” for more information regarding our payment obligations under the Duke License. We have not included future payments under the Duke License in the table above since the payment obligations under the Duke License are contingent upon future events, such as the achievement of specified milestones or generating product sales, and we are unable to estimate the timing or likelihood of achieving these milestones or generating future product sales.

We also enter into contracts in the normal course of business with CROs, CMOs, universities and other third parties for preclinical research studies, clinical trials and testing and manufacturing services. These contracts

do not contain minimum purchase commitments and are cancelable by us upon prior written notice. Payments due upon cancellation consist only of payments for services provided or expenses incurred, including noncancelable obligations of our service providers, up to the date of cancellation. These payments are not included in the table above as the amount and timing of such payments are not known.

Critical accounting policies and use of estimates

Our management's discussion and analysis of financial condition and results of operations is based on our consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of our consolidated financial statements and related disclosures requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities, costs and expenses and the disclosure of contingent assets and liabilities in our consolidated financial statements. We base our estimates on historical experience, known trends and events and various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. We evaluate our estimates and assumptions on an ongoing basis. Our actual results may differ from these estimates under different assumptions or conditions.

While our significant accounting policies are described in more detail in the notes to our consolidated financial statements included elsewhere in this prospectus, we believe that the following accounting policies are those most critical to the judgments and estimates used in the preparation of our consolidated financial statements.

Revenue recognition

Our revenues are generated primarily through collaborative research, license, development and commercialization agreements. The terms of these agreements generally contain multiple elements, or deliverables, which may include (1) licenses, or options to obtain licenses, to use our technology, (2) research and development activities to be performed on behalf of the collaborative partner, and (3) in certain cases, services in connection with the manufacturing of preclinical and clinical material. Payments we receive under these arrangements typically include one or more of the following: non-refundable, upfront license fees; option exercise fees; funding of research and/or development efforts; clinical and development, regulatory, and sales milestone payments; and royalties on future product sales. We classify payments received under these agreements as revenues within our consolidated statements of operations.

In February 2016, we entered into the Servier Agreement for the licensing of our ARCUS proprietary genome editing platform and the research, development, and manufacturing of product for clinical trials and commercialization of products. In September 2018, we entered into a collaboration and license agreement with Gilead, which we refer to as the Gilead Agreement, to develop genome editing tools using our ARCUS proprietary genome editing platform. Both agreements use our genome editing technology for the treatment of certain diseases (see Note 13 to our consolidated financial statements included elsewhere in this prospectus). Consideration we received, or may receive, under these collaboration and license agreements include upfront nonrefundable payments, research funding payments and payments based upon the achievement of certain milestones and royalties on any resulting net product sales.

Revenue is recognized when all of the following conditions are met: (1) persuasive evidence of an arrangement exists, (2) delivery has occurred or services have been rendered, (3) fees are fixed or determinable, and (4) collection of fees is reasonably assured.

We analyze our collaboration arrangements to assess whether they are within the scope of Accounting Standards Codification 808, Collaborative Arrangements, or ASC 808, to determine whether such arrangements

involve joint operating activities performed by parties that are both active participants in the activities and exposed to significant risks and rewards dependent on the commercial success of such activities. This requires that we determine whether elements of the collaboration are deemed to be within the scope of ASC 808 and those that are more reflective of a vendor-customer relationship and therefore within the scope of Accounting Standards Codification 605-25, Revenue Recognition—Multiple-Element Arrangements, or ASC 605. To date, we have no arrangements that are within the scope of ASC 808.

When evaluating multiple element arrangements under ASC 605, we determine whether the arrangement should be divided into separate units of accounting and how the arrangement consideration should be measured and allocated among the separate units of accounting. An element qualifies as a separate unit of accounting when the delivered element has standalone value to the customer. Any delivered elements that do not qualify as separate units of accounting are combined with other undelivered elements within the arrangement as a single unit of accounting. If the arrangement constitutes a single combined unit of accounting, we determine the revenue recognition method for the combined unit of accounting and recognize the revenue over the period from inception through the date the last deliverable within the single unit of accounting is delivered. Our arrangements do not include a general right of return relative to delivered elements.

Amounts received prior to satisfying all revenue recognition criteria are recorded as deferred revenue in our accompanying consolidated balance sheets. Our deferred revenue includes nonrefundable upfront license fees. The deferred revenue is recognized into revenue on a proportional or straight-line basis over the estimated period of our substantive performance obligations or the period the rights granted are in effect. Analyzing the arrangement to identify deliverables requires the use of judgment and each deliverable may be an obligation to deliver services, a right or license to use an asset or another performance obligation.

In arrangements that include license rights and other noncontingent deliverables, these deliverables do not have standalone value because the noncontingent deliverables are dependent on the license rights, are not sold separately and cannot be resold. In addition, when noncontingent deliverables are sold with upfront license rights, the license rights do not represent the culmination of a separate earnings process. As such, we account for the license and the noncontingent deliverables as a single combined unit of accounting. In such instances, the license revenue in the form of nonrefundable upfront payments is deferred and recognized over the applicable relationship period, which historically has been the estimated period of our substantive performance obligations or the period the rights granted are in effect.

We will recognize clinical and development, regulatory, and sales milestone payments as revenue when earned if they are substantive and we have no ongoing performance obligations related to the milestone payment. A milestone payment is considered substantive if it (1) is commensurate with either our performance to achieve the milestone or the enhanced value of the delivered item as a result of a specific outcome from our performance to achieve the milestone, (2) relates solely to past performance, and (3) is reasonable relative to all of the deliverables and payment terms, including other potential milestone consideration, within the arrangement.

Royalties earned on product sales, if any, are recognized based on contractual terms of the agreement when reported sales are reliably measurable and collectibility is reasonably assured, provided that there are no performance obligations then remaining. To date, none of our product candidates have been approved and, therefore, we have not earned any royalty revenue from product sales.

In the event an agreement was to be terminated and we have no further performance obligations at that time, we would recognize as revenue any portion of the non-refundable upfront payment and other payments that had not previously been recorded as revenue and were classified as deferred revenue at the date of such termination.

Accrued research and development expenses

As part of the process of preparing our consolidated financial statements, we are required to estimate our accrued research and development expenses. This process involves reviewing open contracts and purchase orders, communicating with our personnel to identify services that have been performed on our behalf and estimating the level of service performed and the associated costs incurred for the services when we have not yet been invoiced or otherwise notified of the actual costs. The majority of our service providers invoice us in arrears for services performed, on a pre-determined schedule or when contractual milestones are met; however, some require advance payments. We make estimates of our accrued expenses as of each balance sheet date in our consolidated financial statements based on facts and circumstances known to us at that time. Examples of estimated accrued research and development expenses include fees paid to the following:

- CROs and other third parties in connection with performing research and development activities, conducting preclinical studies and clinical trials on our behalf;
- vendors in connection with preclinical development activities; and
- CMOs and other vendors in connection with product manufacturing and development and distribution of preclinical supplies.

We base our expenses related to preclinical studies on our estimates of the services received and efforts expended pursuant to quotes and contracts with CROs that conduct and manage preclinical studies and clinical trials and CMOs that manufacture product for our research and development activities on our behalf. The financial terms of these agreements are subject to negotiation, vary from contract to contract and may result in uneven payment flows. There may be instances in which payments made to our vendors will exceed the level of services provided and result in a prepayment of the expense. In accruing fees, we estimate the time period over which services will be performed and the level of effort to be expended in each period. If the actual timing of the performance of services or the level of effort varies from our estimate, we adjust the accrual or amount of prepaid expense accordingly. Although we do not expect our estimates to be materially different from amounts actually incurred, our understanding of the status and timing of services performed relative to the actual status and timing of services performed may vary and may cause us to report amounts that are too high or too low in any particular period. To date, we have not made any material adjustments to our prior estimates of accrued research and development expenses.

Stock-based compensation

We measure stock options and other stock-based awards granted to our employees, directors, consultants and advisors based on the fair value on the date of the grant and recognize compensation expense for those awards, net of actual forfeitures, over the requisite service period, which is generally the vesting period of the respective award.

For stock-based awards granted to non-employees, compensation expense is recognized over the period during which services are rendered by such non-employees until completed. At the end of each financial reporting period prior to the completion of the service, the fair value of these awards is re-measured using the then-current fair value of our common stock and updated assumption inputs in the Black-Scholes option-pricing model.

We estimate the fair value of each stock option grant on the date of grant using the Black-Scholes option-pricing model, which uses as inputs the fair value of our common stock and assumptions we make for the volatility of our common stock, the expected term of our stock options, the risk-free interest rate for a period that approximates the expected term of our stock options and our expected dividend yield.

Determination of fair value of common stock

As there has been no public market for our common stock to date, the estimated fair value of our common stock has been determined by our board of directors as of the date of each option grant, with input from management, taking into consideration our most recently available third-party valuations of common stock at the time of the grants, as well as our board of directors' assessment of additional objective and subjective factors that it believed were relevant and which may have changed from the date of the most recent valuation through the date of the grant. Third-party valuations, or valuation reports, were performed in accordance with the guidance outlined in the American Institute of Certified Public Accountants' Accounting and Valuation Guide, *Valuation of Privately-Held-Company Equity Securities Issued as Compensation*.

Our common stock valuation reports were prepared using a market approach, utilizing either the guideline M&A or guideline public company methodologies. Under the guideline M&A methodology, a set of mergers and acquisitions within the biotechnology and pharmaceutical industries for similar stage companies were reviewed and an applicable equity value was selected to apply to the company. Under the guideline public company methodology, the market capitalizations of similar public companies were analyzed and an applicable capitalization for the company was selected on the basis of qualitative and quantitative factors.

For each valuation report, an option pricing allocation method, or OPM, was selected to allocate the total equity value across the various securities outstanding at the time of the valuation. The OPM treats common stock and preferred stock as call options on the total equity value of a company, with exercise prices based on the value thresholds at which the allocation among the various holders of a company's securities changes. These third-party valuations resulted in a valuation of our common stock of $2.01, $13.20 and $13.80 per share as of December 31, 2017, November 30, 2018 and January 31, 2019, respectively.

In addition to considering the results of the valuation reports, our board of directors considered various objective and subjective factors to determine the fair value of our common stock as of each grant date, including:

- the prices at which we sold shares of preferred stock and the superior rights and preferences of the preferred stock relative to our common stock at the time of each grant;
- the progress of our research and development programs, including the status and results of preclinical studies for our product candidates;
- our stage of development and commercialization and our business strategy;
- external market conditions affecting the biopharmaceutical industry and trends within that industry;
- our financial position, including cash on hand, and our historical and forecasted performance and operating results;
- the lack of an active public market for our common stock and our convertible preferred stock;
- the likelihood of achieving a liquidity event, such as an initial public offering, or IPO, or sale of our company in light of prevailing market conditions; and
- the analysis of IPOs and the market performance of similar companies in the biopharmaceutical industry.

The assumptions underlying these valuations represented management's best estimate, which involved inherent uncertainties and the application of management's judgment. As a result, if we had used different assumptions or estimates, the fair value of our common stock and our stock-based compensation expense could have been materially different.

Once a public trading market for our common stock has been established in connection with the closing of this offering, it will no longer be necessary for our board of directors to estimate the fair value of our common stock in connection with our accounting for granted stock options and other such awards we may grant, as the fair value of our common stock will be determined based on the quoted market price of our common stock.

Recent accounting pronouncements

A description of recent accounting pronouncements that may potentially impact our financial position, results of operations or cash flows is disclosed in Note 1 to our audited consolidated financial statements included elsewhere in this prospectus.

Off-balance sheet arrangements

We did not have during the periods presented, and we do not currently have, any off-balance sheet arrangements, as defined under SEC rules.

Quantitative and qualitative disclosures about market risk

We are exposed to market risks in the ordinary course of our business. These risks primarily include interest rate sensitivities. Our interest-earning assets consist of cash and cash equivalents, which are denominated in U.S. dollars. We had cash and cash equivalents of $103.2 million, or 74.5% of our total assets, at December 31, 2018. Interest income earned on these assets was $1.9 million for the year ended December 31, 2018. Our interest income is sensitive to changes in the general level of interest rates, primarily U.S. interest rates. At December 31, 2018, our cash equivalents consisted of money market funds and repurchase agreements that were collateralized by deposits in the form of government securities and obligations. Such interest-earning instruments carry a degree of interest rate risk; however, historical fluctuations in interest income have not been significant for us and we do not expect significant fluctuations in the future. We had no debt outstanding as of December 31, 2018.

Emerging growth company status

We are an “emerging growth company,” as defined in the JOBS Act, and we may take advantage of reduced reporting requirements that are otherwise applicable to public companies. Section 107 of the JOBS Act exempts emerging growth companies from being required to comply with new or revised financial accounting standards until private companies are required to comply with those standards. We have elected to take advantage of the extended transition period for complying with new or revised accounting standards; and as a result of this election, our financial statements may not be comparable to companies that comply with public company effective dates. The JOBS Act also exempts us from having to provide an auditor attestation of internal control over financial reporting under Sarbanes-Oxley Act Section 404(b).

We will remain an “emerging growth company” until the earliest of (1) the last day of the fiscal year in which we have total annual gross revenues of $1.07 billion or more, (2) the last day of the fiscal year following the fifth anniversary of the completion of our IPO, (3) the date on which we have issued more than $1.0 billion in nonconvertible debt during the previous three years or (4) the date on which we are deemed to be a large accelerated filer under the rules of the SEC, which generally is when we have more than $700 million in market value of our stock held by non-affiliates and we have been a public company for at least 12 months and have filed one annual report on Form 10-K.

Business

Overview

We are a genome editing company dedicated to improving life through our groundbreaking proprietary genome editing platform, “ARCUS.” We leverage ARCUS in the development of our product candidates, which are designed to treat human diseases and create healthy and sustainable food and agricultural solutions. We believe the versatility and breadth of ARCUS support our ability to develop products across the spectrum of biotechnology. We are actively developing product candidates in three innovative and high value areas where we believe our technology has the potential to overcome the limitations of other genome editing technologies: allogeneic CAR T immunotherapy, *in vivo* gene correction, and food. The U.S. Food and Drug Administration, or FDA, recently accepted our investigational new drug, or IND, application for our first gene-edited allogeneic CAR T cell candidate targeting CD19. We are currently screening patients for our planned Phase 1/2a clinical trial in patients with relapsed or refractory, or R/R, B-cell precursor acute lymphoblastic leukemia and R/R non-hodgkin lymphoma and expect to dose our first patient in this trial in April 2019. We believe this trial will be the first clinical investigation of an allogeneic CAR T therapy for non-hodgkin lymphoma. We believe our proprietary, one-step engineering process for producing allogeneic CAR T cells at large scale in a cost-effective manner will enable us to overcome the fundamental challenges of manufacturing that have limited the CAR T field to date.

Our Pipeline

Allogeneic CAR T immunotherapy

We believe that we have developed a transformative allogeneic chimeric antigen receptor, or CAR, T immunotherapy platform with the potential to overcome certain limitations of autologous CAR T cell therapies and significantly increase patient access to these cutting-edge treatments. Cancer immunotherapy is a type of cancer treatment that uses the body’s immune system to fight the disease. CAR T is a form of immunotherapy in which a specific type of immune cell, called a “T cell,” is genetically engineered to recognize and kill cancer cells. Current commercially available CAR T therapies are autologous, meaning the T cells used as the starting material for this engineering process are derived directly from the patient. As a consequence, the therapy is highly personalized, difficult to scale, and expensive. Our allogeneic approach uses donor-derived T cells that are gene edited using ARCUS and are designed for safe delivery to an unrelated patient. We believe that this donor-derived approach will allow us to consistently produce a potent product by selecting donors with high quality T cells and will lessen the product-to-product variability seen in autologous therapies. We are able to produce allogeneic CAR T cells at a large scale in a cost-effective manner and have the potential to overcome the “one patient: one product” burden of autologous CAR T cell therapies.

We have used the qualities of ARCUS to develop a one-step cell engineering process for allogeneic CAR T cells that is designed to rapidly yield a consistent cell product at a significantly lower cost than autologous CAR T cell therapies. Due to our one-step editing method and the decision early in the development of our allogeneic CAR T immunotherapy platform to invest in process development, we have scaled our manufacturing process and are currently producing allogeneic CAR T cells at large scale in accordance with good manufacturing practice, or GMP.

In February 2016, we entered into a development and commercial license agreement, as amended, with Baxalta (now Shire Plc), which we refer to as the Servier Agreement. This agreement was assigned to Les Laboratoires Servier, or Servier, in connection with Servier’s acquisition of Shire’s oncology business in August 2018. Pursuant to this agreement we have agreed to perform early-stage research and development on individual T cell modifications for up to six unique antigen targets, the first of which was selected by Baxalta at the inception of the

agreement and the remaining five of which may be selected by Servier over the first four years of the agreement. Upon selection of an antigen target, we have agreed to develop the resulting therapeutic product candidates through Phase 1 clinical trials and prepare the clinical supply of such product candidates for use in Phase 2 clinical trials. We have the ability to opt-in to a 50/50 co-development and co-promotion agreement in the United States on all licensed products under the Servier agreement.

Our most advanced program, PBCAR0191, is an allogeneic CAR T cell therapy targeting the well-validated tumor target CD19 and is being developed for acute lymphoblastic leukemia, or ALL, and non-hodgkin lymphoma, or NHL. CD19 is a protein that is expressed on the surface of B cells. Our IND for PBCAR0191 was accepted by the FDA in November 2018. We are currently screening patients for our planned Phase 1/2a clinical trial in patients with R/R B-cell precursor ALL and R/R NHL and expect to dose our first patient in this trial in April 2019. We expect to report interim data results from this trial in early 2020. The FDA has granted PBCAR0191 orphan drug designation for the treatment of ALL. We are also in preclinical development of CAR T cell therapies targeting the tumor antigens CD20, BCMA, and CLL-1. We expect to submit an IND to the FDA for our CD20 product candidate in the fourth quarter of 2019 and for each of our BCMA product candidate and our CLL-1 product candidate in 2020.

***In vivo* gene correction.** Our goal is to cure genetic diseases by correcting the DNA errors responsible for causing them. *In vivo* gene corrections are gene corrections that take place in a living organism. We are advancing a deep portfolio of diverse programs toward *in vivo* efficacy and toxicity studies. We are generating a significant large animal dataset that we believe will be the most comprehensive of any in the field and have observed high-efficiency *in vivo* genome editing in non-human primates in our preclinical studies, as highlighted in our July 2018 publication in *Nature Biotechnology*. We believe this is the first peer-reviewed publication of *in vivo* genome editing data in non-human primates. In our preclinical studies, we observed the high-efficiency editing of the PCSK9 gene in non-human primates using ARCUS and, even at the highest dose, the treatment was observed to be well-tolerated. We have continued to observe the subjects for over two years since initial dosing and the benefit of the treatment in these studies appears to be permanent, which we believe is due to modifications to the DNA itself.

In September 2018, we announced a collaboration with Gilead Sciences, Inc. to co-develop an ARCUS-based product candidate that is designed to cure chronic Hepatitis B infection. We intend to submit an IND to the FDA in 2020 for this product candidate. We are also in the discovery stage for other *in vivo* indications: familial amyloid polyneuropathy, primary hyperoxaluria, hemophilia A, retinitis pigmentosa, lipoprotein lipase deficiency and familial hypercholesterolemia. We intend to select an indication and target for our next *in vivo* product candidate in the first half of 2019.

Food. Our food platform, which we operate through our wholly owned subsidiary, Elo Life Systems, or Elo, is an integrated suite of gene discovery and crop engineering technologies that is designed to generate pre-breeding materials in collaboration with leading food producers. Pre-breeding material is a gene edited crop intermediate that the collaborating partner can integrate into their breeding program and use in producing new crop varieties. We believe we have the most in-depth experience in crop genome editing in the industry. Over the last decade, we have worked with some of the largest plant biotechnology companies to edit gene targets and develop potential product candidates in a variety of crop plants. By combining the power of our ARCUS technology platform with target discovery, transformation and high throughput trait evaluation, we are enabling our partners to potentially address critical issues in food and agriculture created by climate change and dramatic shifts in consumer preference toward healthier eating. Our collaboration-based business model enables us to remain capital efficient throughout the product development cycle while generating revenue through various revenue-sharing models. For example, since 2014, Elo and Cargill have been engaged in a collaboration to produce ARCUS-optimized canola varieties and have achieved significantly lower levels (less than 4.5%) of saturated fatty acids compared to the current levels (7%) in greenhouse studies. Prior to commercialization of any of our food product candidates, we must complete greenhouse studies and three phases of field testing.

Our team

We believe that our team, whom we call Precisioneers, has among the deepest scientific experience and capabilities of all genome editing companies. Derek Jantz, Ph.D., our Chief Scientific Officer and a co-founder of Precision, and Jeff Smith, Ph.D., our Chief Technology Officer and also a co-founder of Precision, have been working with genome editing technology for more than 15 years. They are pioneers in the genome editing field and developed our ARCUS genome editing platform to address what they perceived as limitations in the existing genome editing technologies. Our Chief Executive Officer, Matthew Kane, also a co-founder of Precision, has almost 20 years' experience in life sciences, most of which has been working in genome editing.

We have selectively expanded our team of Precisioneers to include individuals with extensive industry experience and expertise in the discovery, development, manufacture and commercialization of cell and gene therapies and the creation of innovative solutions to myriad problems affecting food systems. Over half of our team of Precisioneers have advanced degrees, including 48 with Ph.D. degrees.

We are a purpose driven organization, and we have carefully promoted a culture that values innovation, accountability, respect, adaptability and perseverance. We strive to ensure that our open, collaborative culture empowers Precisioneers to be their best selves and do their best work. We strongly believe that our shared values will help our team navigate and overcome any challenges we may experience as we pursue our mission of improving life through genome editing. Our culture has helped build a world-class team with industry-leading experience in genome editing and continually attracts new talent to further build our capabilities. Our team is a group of motivated individuals that value the opportunity to contribute their time and talents toward the pursuit of improving life. Precisioneers appreciate high-quality research and are moved by the opportunity to translate their work into treatments and solutions that will impact human health.

Our strategy

We are dedicated to improving life. Our goal is to broadly translate the potential of genome editing into permanent genetic solutions for significant unmet needs. Our strategy to achieve this goal includes the following key elements:

- **Create a fully integrated genome editing company capable of delivering solutions that address unmet needs impacting human health.** We believe that, to be a leader in the field of genome editing and maximize the impact of our ARCUS genome editing platform, we must be able to control those elements of our business that may provide us with certain strategic advantages or operational efficiencies. We intend to continue to invest in comprehensive research, development and commercial capabilities that provide control and oversight of our product candidates from discovery through commercialization.
- **Accelerate advancement of our first four allogeneic CAR T immunotherapy product candidates while investing in the research and development of additional allogeneic CAR T programs.** We believe that we have developed the first allogeneic CAR T cell manufacturing platform capable of producing drug product at scale today. We have selected four validated CAR T cell targets that we believe offer the greatest chance of clinical success for our initial product candidates, which we intend to rapidly advance into clinical development. In November 2018, the FDA accepted the IND for our lead CAR T cell product candidate targeting CD19. We are currently screening patients for our planned Phase 1/2a clinical trial in patients with R/R B-cell precursor ALL and R/R NHL and expect to dose our first patient in this trial in April 2019.
- **Advance *in vivo* genetic correction programs into human clinical trials.** In our preclinical studies, we observed the high-efficiency and tolerability of *in vivo* genome editing in a non-human primate, as published in *Nature Biotechnology* in July 2018. To our knowledge, we are the first company to complete this milestone,

which we believe to be critical to successful *in vivo* genome editing therapeutic development. We intend to build on this early success by diligently advancing a diverse portfolio of preclinical *in vivo* gene correction programs through additional large animal studies, focusing initially on gene targets occurring in the liver and eye. Based on the results from these large animal studies, we intend to advance a subset of these programs to human clinical trials.

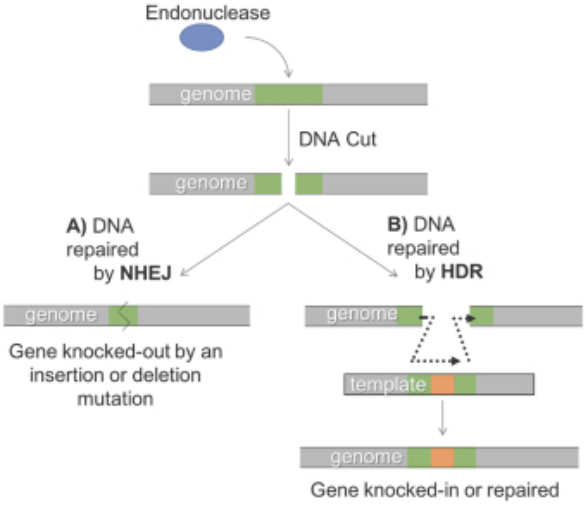
- **Build a food business focused on developing products designed to improve human health and respond to the impacts of climate change.** We believe that rapidly changing consumer preferences and food insecurity resulting from population growth and climate change will drive significant demand for genome-edited food products. We are building a fully integrated discovery and development platform that combines genome editing, gene discovery, plant transformation and high-throughput testing to enable accelerated innovation in the food industry. We employ a business model that is focused on collaborating with critical stakeholders within the supply chain from the outset of any given project. We believe that this approach will enable us to successfully respond to growing unmet needs within food supply to build a human health-focused business in a capital-efficient manner.
- **Continue investing in the optimization of ARCUS and enabling technologies.** We believe that a key to our future success is the quality of the genome editing tools that we produce. Since our founding, we have devoted ourselves to continuously refining the precision and efficiency of our core genome editing platform. We intend to continue this investment in ARCUS while surrounding it with enabling technologies and expertise to retain what we believe is a leadership position in the field.
- **Create an environment that is a destination of choice for premier talent within the life sciences industry.** We believe that we currently have among the deepest and strongest skill set within the genome editing industry and credit much of our past success to our commitment to our team and culture. Our future success will depend on our ability to continue to attract and retain world-class talent within our markets of interest. We intend to consciously invest in fostering an environment within our company that is both challenging and supportive and inspires our team to broadly translate genome editing into permanent genetic solutions.
- **Expand the breadth of our operations through additional product platforms and strategic relationships.** We believe that the ARCUS genome editing platform has broad utility beyond our current areas of focus. We intend to invest in the development of additional product platforms and seek collaborations with companies with expertise in areas outside of our current target markets to maximize the value of our company.

Overview of genome editing

Deoxyribonucleic acid, or DNA, carries the genetic instructions for all basic functions of a living cell. These instructions are encoded in four different molecules, called bases, which are strung together in specific sequences to form genes. Each gene is responsible for a specific function in a cell, and the complete set of genes in a cell, which can consist of tens of thousands of genes and billions of individual bases, is known as a genome. The complete genome sequence has been determined for many organisms, including humans. This allows scientists to identify specific genes and determine how their unique sequences contribute to a particular cellular function. Studying variations in gene sequences further informs an understanding of why a cell behaves a certain way, which can greatly enhance understanding of what causes and how to treat aberrant behavior that leads to disease.

Genome editing is a biotechnology process that removes, inserts or repairs a portion of DNA at a specific location in a cell’s genome. Early applications of genome editing focused on advancing genetic research. As genome editing technologies have advanced, their application is moving beyond understanding disease to

treating or preventing disease by editing DNA. Genome editing is accomplished by delivering a DNA cutting enzyme, called an endonuclease, to a targeted segment of genetic code. Once the endonuclease cuts the DNA, the cell has to repair the break to survive and will generally do so in one of two ways, as shown below.



There are two primary mechanisms of DNA repair, non-homologous end joining, or NHEJ, and homology directed repair, or HDR. As shown in A) above, NHEJ is a pathway that repairs breaks in DNA without a template. NHEJ is the less precise method of repair that prioritizes speed over accuracy, making it prone to leaving insertions and/or deletions of DNA bases at the cut site. These insertions or deletions can disrupt the gene sequence and can be used to inactivate or “knock out” the function of the gene. Accordingly, genome editing technologies can be used to permanently knock out a gene in a cell or organism by creating a break in the DNA sequence of that gene.

As shown in B) above, HDR is a mechanism of DNA repair whereby the cell uses a second DNA molecule with a sequence similar to that of the cut DNA molecule to guide the repair process. Since HDR uses a “template” of similar genetic information to guide the repair process, it is the more precise mechanism of cellular repair. HDR results in the sequence of the template being copied permanently into the genome at the site of the DNA cut. If we provide a template DNA molecule directly to the edited cell and the cell repairs itself using HDR, a new gene can be incorporated or “knocked in” at a precise location in the genome. Alternatively, the use of HDR can “repair” a DNA mutation by correcting it to the proper functioning sequence when repairing the break. Thus, genome editing endonucleases can be used to introduce a variety of different changes to the genetic code of a cell or organism including gene knockout, gene insertion and gene repair.

There are several genome editing technologies, including ARCUS, zinc-finger nucleases, or ZFNs, TAL-effector nucleases, or TALENs, and CRISPR/Cas9. These technologies differ from one another principally in the properties of the endonuclease that they each employ. The different endonucleases have fundamentally different mechanisms of recognizing and cutting their DNA targets, which gives each technology advantages and disadvantages depending on how each is used.

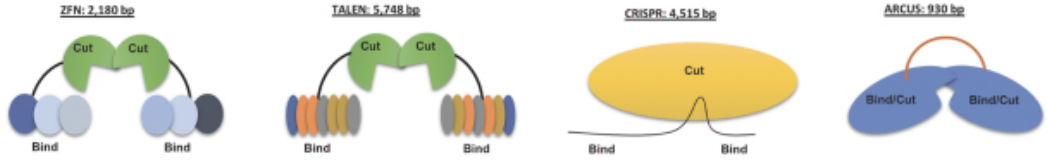
Our approach to genome editing

We are pioneers in the field of genome editing and have extensive experience with a breadth of genome editing technologies. Our Precision platform was developed to address limitations of other editing technologies that

could impair their deployment for therapeutic applications. We looked to nature for examples of genome editing and found the I-CreI endonuclease from the algae *Chlamydomonas reinhardtii*. Unlike ZFN, TALEN or CRISPR/Cas9, I-CreI is a natural enzyme that evolved to edit a large, complex genome. In nature, it is responsible for modifying a specific location in the algae genome by inserting a gene using the HDR process, according to scientific literature.

We believe that I-CreI has a number of attributes that make it attractive for the development of novel genome editing endonucleases, such as:

- **Specificity.** Complex genome editing applications, especially those involving the human body, require a high level of endonuclease specificity to limit the likelihood that the endonuclease will recognize and edit any genetic sequence other than its intended target. Based on scientific literature, we believe that several attributes of I-CreI naturally inhibit off-target cutting. I-CreI:
  - Recognizes and cuts a DNA sequence in the genome of algae that is 22 base pairs in length. A sequence of this length is statistically expected to occur only once in a large genome.
  - Recognizes its DNA target site through a large number of complex molecular interactions with the bases. Relative to other endonucleases, an unusually high percentage of the I-CreI protein surface area is dedicated to specific contacts with the DNA bases. This method of site recognition enhances I-CreI's ability to discriminate among similar sequences of DNA, reducing the likelihood that it will cut DNA sequences that differ even slightly from the intended DNA sequence.
  - Physically couples the functions of DNA binding and DNA cutting. The region of I-CreI that is responsible for DNA site recognition also contains the region that cuts the DNA, or the active site. Due to this structure, the active site is not in a position to cut unless the enzyme is seated properly on the correct DNA sequence. ZFN, TALEN and CRISPR/Cas9 are multi-domain endonucleases in which the DNA-binding and DNA-cutting functions reside in different regions of the enzyme.



  - Remains inactive in the absence of its DNA target site. When I-CreI is not bound to its proper DNA target site, it folds up on itself such that its active site is blocked from external interaction. In this form, I-CreI is inert. This structural configuration provides a type of natural "on/off switch" that reduces I-CreI's activity away from the target site. Other genome editing endonucleases lack this type of natural control over the enzyme's cutting activity.
  - Cuts slowly and with low turnover. Relative to other genome editing endonucleases and to enzymes in general, I-CreI has a very slow mechanism of action. I-CreI takes a relatively long time to cut its DNA target site and, after doing so, remains bound to the cut DNA ends. These properties greatly reduce the likelihood that I-CreI will cut any other DNA site after making its initial on-target cut. We believe that this translates directly to a reduction in the frequency of off-target cutting without sacrificing on-target editing efficiency. In contrast, other editing endonucleases have high rates of catalysis and turnover because their natural function is defending bacteria from viruses.
- **Efficiency.** Most applications of genome editing technology require that a sufficient portion of the targeted cells are edited to achieve the desired result. The activity level of the endonuclease is one factor that can

affect how many cells are edited. The slow catalytic mechanism of I-CreI imparts specificity but does not impact its on-target efficiency for genome editing purposes because genome editing involves cutting only a single site in a cell. As such, I-CreI is able to achieve a high level of on-target editing while rarely cutting off-target, as supported by scientific literature.

- **Delivery.** Size and structural simplicity affect the ease with which endonucleases can be delivered to cells for editing. I-CreI is very small relative to other genome editing endonucleases. It is approximately one quarter to one sixth of the size of the ZFN, TALEN and CRISPR/Cas9 endonucleases. Unlike those endonucleases, I-CreI can be delivered as a single gene. As such, we believe it is compatible with many different delivery mechanisms. Additionally, I-CreI's size and structure facilitate the simultaneous delivery of multiple engineered endonucleases to introduce more than one edit to a cell. Both of these properties significantly broaden the spectrum of potential applications for I-CreI-based genome editing endonucleases.
- **Type of cut.** The three prime, or 3', overhangs created when I-CreI cuts DNA have been shown to promote DNA repair through a mechanism called "homology directed repair," or HDR. 3' overhangs are stretches of unpaired nucleotides in the end of a DNA molecule. A genome editing technology that facilitates cellular repair through HDR enables applications that require a gene insertion or gene repair. Unlike other editing endonucleases, I-CreI creates four base 3' overhangs when it cuts its DNA site, which increases the likelihood that the cell will repair the DNA cut through HDR. As such, the DNA cuts created by I-CreI can be exploited to efficiently insert or repair DNA, consistent with the natural role of I-CreI in catalyzing the targeted insertion of a gene in algae.
- **Programmability.** I-CreI recognizes its DNA target site through a complex network of interactions that is challenging to re-program for new editing applications involving different DNA sequences. The challenges associated with re-programming I-CreI have, historically, hampered its adoption by the genome editing community in favor of more easily engineered endonucleases. This engineering challenge represents a high barrier to entry and has enabled us to secure a strong intellectual property position and control over what we believe to be a superior genome editing technology.

Other than the key programming challenge, we believed that the differentiated properties of I-CreI cited above made it an ideal "scaffold" for the development of novel genome editing tools. Moreover, we believed those properties were differentiated enough from other editing technologies to merit substantial investment in overcoming the key challenge of programmability. To that end, we invested 15 years of research effort to develop a robust, proprietary protein engineering method that now enables us to consistently re-program I-CreI to direct it to targeted sites in a genome. We call our approach "ARCUS."

Our ARCUS genome editing platform

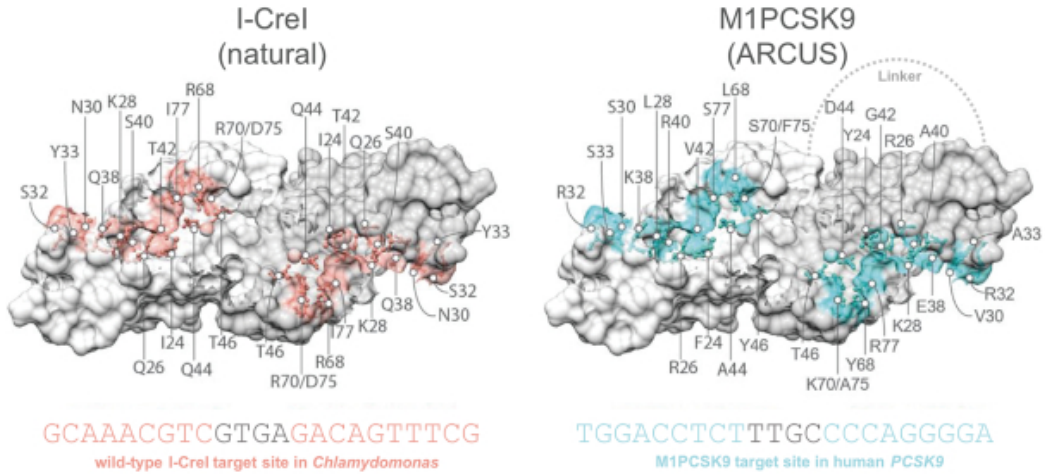
ARCUS is a collection of protein engineering methods that we developed specifically to re-program the DNA recognition properties of I-CreI. In nature, the I-CreI endonuclease recognizes and cuts a DNA sequence in the genome of algae. To apply I-CreI to genome editing in other cells or organisms, we must modify it to recognize and cut a different DNA sequence for each new application we pursue. Since the I-CreI endonuclease evolved to recognize its target sequence in the algae genome with a high degree of selectivity, as supported by scientific literature, it was necessary for us to develop sophisticated protein engineering methods to re-engineer I-CreI endonucleases to bind and cut a different DNA sequence. Using the ARCUS process, we create customized endonucleases for particular applications. We call these custom endonucleases "ARCUS nucleases." Our process is proprietary and core components are claimed in an extensive international patent portfolio. Moreover, since the ARCUS process involves a sophisticated blend of protein engineering art and science, each ARCUS nuclease we create is novel and, we believe, patentable. As of December 31, 2018, we have obtained U.S. patents with

claims directed to three ARCUS nucleases as compositions of matter, and currently claim over 250 ARCUS nucleases as compositions of matter in pending U.S. and foreign patent applications.

Our objective with ARCUS is to redirect I-CreI to a new location in a genome without compromising its editing abilities. To accomplish this, we modify the parts of the enzyme that, as reported by scientific literature, are involved in recognizing the specific DNA target site. These enzyme parts are also reported to comprise the I-CreI active site and to be involved in anchoring the enzyme to its DNA site in the algae genome. In our preclinical studies, we have observed that these modifications allowed us to control how tightly an engineered variant of I-CreI binds to its intended DNA site, as well as how quickly it cuts, in a plant or animal cell. By adjusting these two parameters, we observed that we can generally control the efficiency with which the engineered endonuclease cuts its intended target site or any potential off-target sites.

The natural I-CreI target site is pseudo-palindromic, meaning the first half of the sequence is approximately a mirror image of the second half of the sequence. Palindromic DNA sites are rare in most genomes so it was necessary for us to develop additional technology that would overcome this limitation on the diversity of DNA sites that we can target. To this end, the ARCUS process involves the production of *two* re-programmed I-CreI proteins for each target site. These two different proteins are then linked together into a single protein that can be expressed from a single gene. This approach, called a “single-chain endonuclease,” represents a major advancement in I-CreI engineering because it enables our ARCUS nucleases to recognize and cut *non*-palindromic target sites using an endonuclease that, like natural I-CreI, is very small and easy to deliver to cells.

The graphic below depicts the molecular structure of natural I-CreI in comparison to an engineered ARCUS nuclease called “M1PCSK9.” The regions of the structures colored in pink or cyan represent the amino acid building blocks that are responsible for contacting the DNA target site and determining the sequence of DNA bases that the endonuclease recognizes and cuts. The DNA target sites recognized by the two endonucleases are shown below the structures.



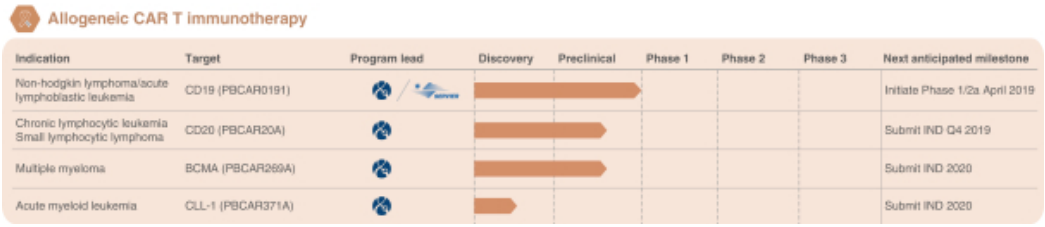
Since creating an ARCUS nuclease requires such extensive reengineering of I-CreI, it is, generally, an iterative process that involves multiple cycles of design and testing. We can typically produce a first-generation ARCUS nuclease in seven weeks. First-generation nucleases are suitable for research and development, proof-of-concept studies or other non-therapeutic applications. For therapeutic applications requiring the lowest possible off-targeting, however, we are rarely satisfied with generation one and each endonuclease undergoes extensive optimization. To this end, we thoroughly interrogate the nuclease with respect to its on-

and off-target cutting properties using ultra-sensitive tests that we developed specifically for use with ARCUS. These results then inform our design of a second-generation nuclease with the goal of optimizing on-target efficiency while minimizing off-target cutting. Therapeutic ARCUS nucleases typically require two to four cycles of design and testing, often resulting in off-target cutting frequencies that are below the limit of detection with our most sensitive assays. This process can take six months or longer and has resulted in development of "therapeutic-grade" editing endonucleases.

The ARCUS process is robust and reproducible. It enables us to create engineered variants of the I-CreI endonuclease that recognize and cut DNA sites that bear little resemblance to I-CreI's natural target site. Importantly, however, ARCUS retains the attributes of I-CreI that we believe make it highly suitable as a genome editing endonuclease for complex commercial applications. We expect ARCUS nucleases to be exquisitely specific as a result of the natural structure of I-CreI and the intricate design process we employ to create them. We believe ARCUS nucleases are the smallest and easiest to deliver genome editing endonucleases. Like I-CreI, in our preclinical studies, ARCUS nucleases have been observed to produce DNA cuts with 3' overhangs that promote HDR, facilitating gene insertions and gene repairs in addition to gene knockouts. We believe that these attributes will enable us to translate ARCUS into patient-based clinical trials and a wide array of product candidates that have the potential to address the limitations of other genome editing technologies and improve life.

We believe that ARCUS is a leading genome editing platform for therapeutic and food applications. Realizing the potential of ARCUS, however, requires supporting technologies and capabilities. To facilitate the potential commercial deployment of ARCUS in different fields, we surround it with ancillary technologies, domain expertise and infrastructure specific to that area of development. Our goal is to leverage ARCUS to build additional product-development platforms designed to rapidly generate new products in a given field. We are currently developing products from three such platforms: allogeneic CAR T immunotherapy, *in vivo* gene correction and food.

Our allogeneic CAR T immunotherapy platform



We are leveraging the properties of ARCUS in an integrated platform for the development and large-scale production of allogeneic CAR T cell immunotherapies. A key to the success of this platform is a proprietary, one-step method for modifying the genetics of T cells from a healthy donor to make them detect and kill cancer cells. This method allows us to manufacture CAR T cell product candidates rapidly, at large scale and with greater consistency than currently marketed CAR T cell therapies. As such, we believe that our allogeneic CAR T cell platform will greatly increase patient access to these cutting-edge treatments.

CAR T cell therapies

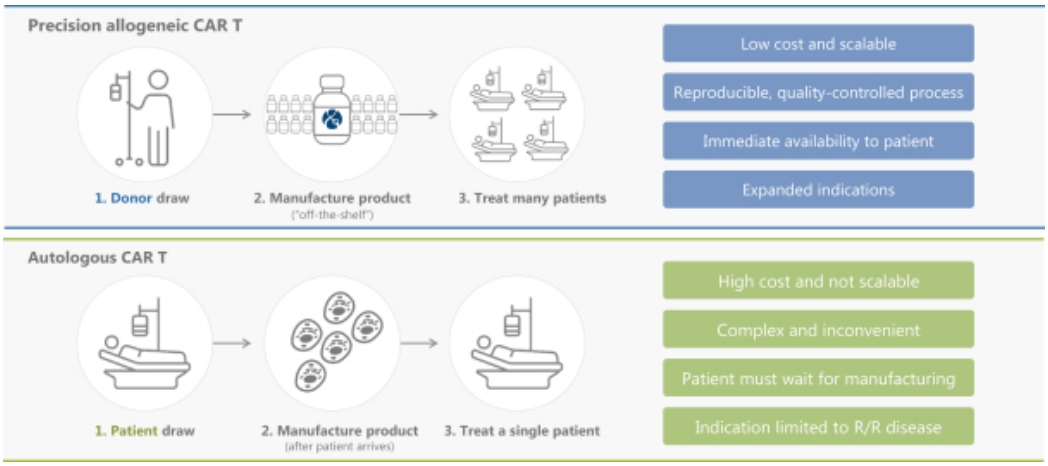
CAR T cell therapy is a form of cancer immunotherapy that uses a patient's immune system to kill cancer cells. T cells are a component of the immune system that can distinguish pathogen-infected or tumor cells from healthy cells and kill them. Recognition of pathogen-infected cells or tumor cells occurs through a protein called

a T cell receptor, or TCR, that is expressed on the surface of T cells. Tumor cells, however, have evolved numerous ways to evade TCR-mediated killing by T cells. In CAR T cell therapy, T cells are engineered *ex vivo* to express a protein called a chimeric antigen receptor, or CAR, that recognizes specific tumor cells and allows the T cells to function independently of the TCR, thus circumventing tumor cells' evasion of the TCR. CAR T cell therapy has been shown in clinical trials to be an effective treatment for patients that have not responded to traditional cancer treatments, and there are now two FDA approved CAR T cell products available to treat certain types of leukemia and lymphoma.

The most common form of CAR T cell therapy, which includes the two approved therapies, is referred to as "autologous" CAR T cell therapy because the CAR T cells are generated using T cells taken directly from the cancer patient. T cells are harvested from the patient, genetically engineered *ex vivo* to express a CAR, and then injected back into the patient. While autologous CAR T cell therapy has been shown to be effective for treating certain tumor types, it has several significant drawbacks:

- **Patient eligibility.** Many patients may not be eligible for the treatment because of low T cell numbers and poor T cell quality or because the risk of undergoing the process to harvest T cells is too great.
- **Consistency.** Since each autologous therapy is, by definition, unique, it is difficult to define standards of safety and efficacy or to thoroughly assess the quality of the product prior to infusion into the patient.
- **Delay in treatment.** Because the process to make CAR T cells can take several weeks, there is a significant delay in treating what can often be very aggressive tumors. If manufacturing complications such as contamination, mislabeling or low yield are encountered, the patient may not survive long enough to attempt manufacturing a second time.
- **Cost.** The CAR T cell manufacturing process is complex and expensive. In the case of an autologous therapy, the process must be performed, in its entirety, for each patient. As such, scaling of the manufacturing process is exceedingly difficult, and the cost of product manufacturing has resulted in high treatment costs per patient. This high cost of treatment, along with the practical complexities described above, limits the availability of autologous CAR T cell therapies to patients.

We believe that the use of allogeneic, or donor-derived, CAR T cells will address many of the challenges associated with autologous CAR T cell therapy. An allogeneic approach allows selection of donors using specific criteria to define “healthy” T cells, which we expect will lessen the product-to-product variability seen in autologous therapies. Donor-derived cells could be used in any patient, eliminating the “one patient: one product” burden of autologous CAR T cell therapies. Because healthy donors would provide the starting material, patients that were too sick or otherwise unqualified for an autologous approach may benefit from an allogeneic CAR T cell therapy. Additionally, patients receiving an off-the-shelf allogeneic treatment would not have to wait for the manufacture of a personalized autologous treatment, which could be further delayed by manufacturing difficulties. By scaling the manufacturing of CAR T cells and optimizing the manufacturing process for a specific pool of donors, we believe that allogeneic CAR T cells can be manufactured at costs that are significantly lower than autologous CAR T cells and that will, over time, approach the manufacturing costs for conventional biologic drugs. These potential advantages of an allogeneic approach should allow for a safer, more predictable product with defined quality standards and significantly increase patient access.



The major challenge to producing allogeneic CAR T cells is that donor-derived T cells still express their own TCR. Because the TCR enables T cells to recognize cells that are foreign to the donor, they may induce graft versus host disease, or GvHD, if introduced to the patient in their natural form. This is a dangerous condition in which the donor T cells indiscriminately attack cells in the body of the patient. Accordingly, expression of the TCR must be eliminated in donor cells before the cells can be engineered into CAR T cells and administered to a patient. An allogeneic CAR T cell therapy therefore requires the use of a genome editing technology like ARCUS to knock out TCR genes in the DNA to produce “universal” donor cells that are designed to be incapable of eliciting GvHD.

We and others have shown that genome editing can be used to eliminate expression of the TCR on donor cells, and there are several companies working on gene-edited allogeneic CAR T cell therapies. However, there are a number of challenges associated with manufacturing gene-edited allogeneic CAR T cells, including the following:

- **T cell phenotype.** T cells actually comprise several subtypes of different cells. Some subtypes of T cells are directly responsible for killing virus-infected or tumor cells, while other subtypes serve a helper function. Some subsets retain a “memory” function and can be recalled later if the target tumor reappears, and some subsets even decrease the killing activity of T cells. These subsets are distinguished by the unique combination of proteins they express on their cell surface, which is described as their “phenotype.”

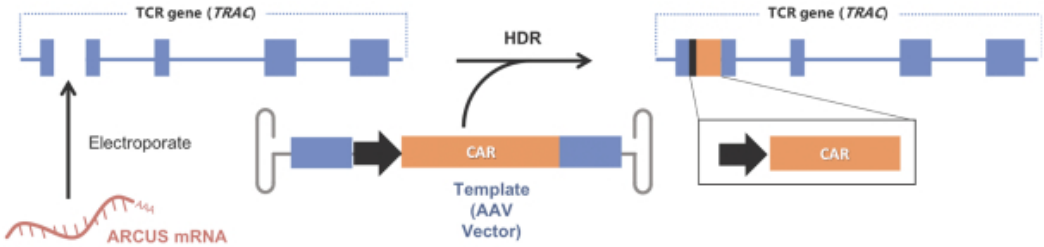
Understanding what phenotypes of T cells are best for a CAR T cell therapy is important, as is the ability to maintain the stability of those phenotypes throughout the manufacturing process. Depending on growth conditions, phenotypes of T cells may change over the course of a manufacturing run, and the final product may not be the desired mix of T cell subtypes.

- **Consistency.** In most CAR T cell therapies, the CAR is introduced into the T cell using a viral vector, usually a lentiviral vector. Lentiviral vectors are retroviruses that are typically engineered to insert DNA, in this case the gene encoding a CAR, into a random location in the genome of a cell. When introduced in this manner, CAR expression typically varies significantly from cell-to-cell depending on the number of CARs that were delivered and where in the T cell genome they were inserted. This variability can cause CAR T cells to be inconsistent from cell-to-cell within the same CAR T cell batch. Too little expression could make the CAR T cell unable to activate and kill when it identifies a cancer cell. Too much expression could lead the CAR T cell to become hyper-stimulated, which can lead to an inactive state known as “exhaustion.”
- **Scalability.** Manufacturing scale drives the cost and availability of the final “off-the-shelf” product. If an allogeneic CAR T cell therapy cannot be manufactured at large scale, it has few advantages over an autologous therapy. While generating allogeneic CAR T cells at lab scale (a few million cells) is straightforward, manufacturing them at a clinically relevant scale (billions of cells) is a major challenge that is impacted by, among other things, the efficiency of CAR gene insertion, the efficiency of on- and off-target genome editing, starting donor T cell phenotype and the duration of the manufacturing process.

Our approach to allogeneic CAR T cells

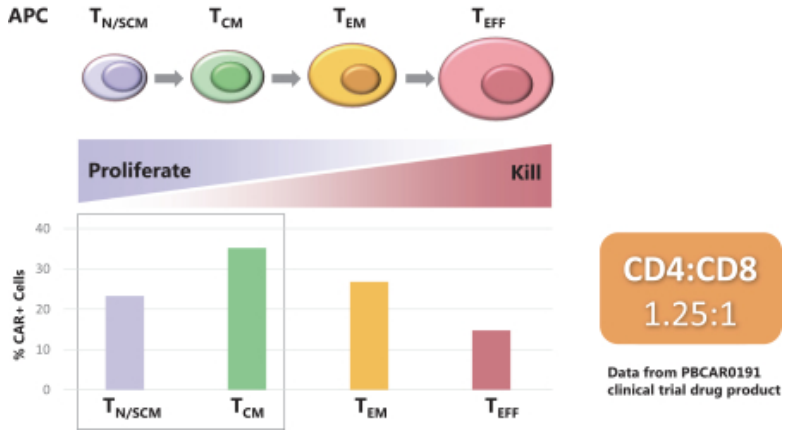
We have used the qualities of ARCUS to create a one-step cell engineering process for allogeneic CAR T cells that we believe yields a well-defined cell product in a cost-effective manner. To produce an allogeneic CAR T cell, it is necessary to make two edits to the DNA of T cells from a healthy donor. First, it is necessary to knock out the gene that encodes the TCR to prevent the donor-derived T cells from eliciting GvHD in the patient. The TCR is actually a complex of several different components encoded by different genes, and knocking out any one of them is generally sufficient to prevent the TCR from functioning. Second, it is necessary to add, or knock in, a gene that encodes the CAR to give the T cells the ability to recognize and kill cancer cells. Precision developed a proprietary, one-step method for achieving both genetic changes simultaneously. This method, aspects of which are protected by nine issued U.S. patents, involves the use of ARCUS to target the insertion of a CAR gene directly into the gene that encodes the alpha subunit of the TCR. This approach adds the DNA encoding the CAR while simultaneously disrupting the DNA encoding the TCR, essentially replacing one gene with the other.

One-step engineered allogeneic CAR T cells

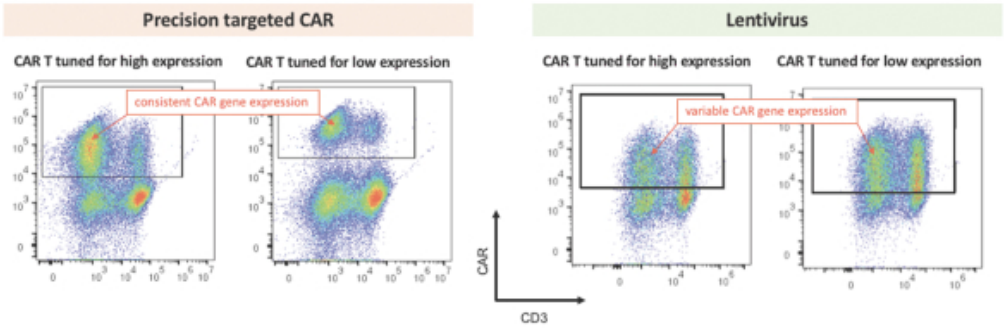


We believe that our one-step engineering approach, and the differentiated attributes of the ARCUS nucleases used to implement it, will overcome many of the critical challenges associated with allogeneic CAR T cell production as follows:

- **T cell phenotype.** According to scientific literature, T cell phenotype has a profound impact on the efficacy of CAR T cell therapy. Specifically, "young" CAR T cells with naïve and central memory phenotypes have been observed to undergo the most robust proliferation following administration, which leads to a therapeutic effect. Therefore, we have established a T cell platform that is designed to maximize the percentage of cells with these ideal phenotypes. Our process starts with carefully screening donors to identify individuals with high percentages of naïve or central memory T cells and a ratio of CD4:CD8 T cells that we believe should yield the most potent cell product. To this end, we have developed our own set of analytics for screening candidate donors and have put significant effort into identifying individuals with the desired T cell profiles. We then use proprietary growth strategies and media to maintain the selected phenotype throughout the CAR T manufacturing process. Importantly, our one-step genome editing approach helps minimize cell processing time, which helps prevent the CAR T cells from differentiating during the process. We believe our 10-day allogeneic manufacturing process is the shortest in the industry. The figure below shows phenotype data from PBCAR0191 CAR T cells that were produced as anticipated drug product for our planned Phase 1/2a clinical trial in patients with R/R B-cell precursor ALL and R/R NHL. The drug product comprises mostly naïve ($T_{N/SCM}$) and central memory (T_{CM}) T cells in a CD4:CD8 ratio of 1.25:1.



- **Consistency.** By targeting the insertion of the CAR gene to a defined location in the DNA of the cell, we are able to produce populations of T cells that are identical at the DNA level. This makes the cells in our CAR T cell drug formulation less heterogeneous as compared to manufacturing processes that use lentiviral vectors. Importantly, our genome editing process gives us greater control over the amount of CAR that is expressed on the surface of each CAR T cell, which determines how easily the CAR T cell is activated once it encounters a cancer cell. This allows us to "fine-tune" the CAR T cells to ensure that they respond appropriately to the cancer but do not become hyper-activated or exhausted. The below comparison demonstrates the difference in consistency achieved by using lentivirus delivery compared with targeted delivery through an ARCUS nuclease. CAR T cells produced using ARCUS exhibit reduced cell-to-cell variability as well as more controlled levels of CAR gene expression depending on whether the cells are tuned for high expression or low expression.



- **Scalability.** To realize the potential benefits of allogeneic CAR T cell therapy, it will be important to manufacture as many cells as possible in each batch in accordance with GMP. Scaling efficiently requires scale-up at every step in the process and, as with all drug manufacturing, process development takes significant time and capital. We made the decision early in the development of our CAR T cell platform to invest in process development and manufacturing rather than initiating clinical trials with a process that would not fully support development and commercialization. We did this, in part, because we believed that several attributes of ARCUS, such as high specificity and high knock-in efficiency, would allow us to scale manufacturing more effectively than our competitors. As a consequence of our early investment and the one-step editing method enabled by ARCUS, we have scaled our manufacturing process today. Over the last twelve months, we have manufactured our lead anti-CD19 allogeneic CAR T cell product candidate at a multi-billion cell scale consistently, and our best manufacturing runs have yielded over one hundred doses of drug product at a dose of 1.0 x 10^6 CAR T cells/kg, which is one of the expected dose levels in our planned Phase 1/2a clinical trial in patients with R/R B-cell precursor ALL and R/R NHL. The table below summarizes results from our last three full-scale manufacturing campaigns, each of which occurred in the last six months and produced a GMP batch of PBCAR0191 to support this planned trial.

Batch name	Product	Total CAR T cell yield	# vials frozen (60M CAR T cells/vial)
CTM1	PBCAR0191 (GMP)	15.0e9	130
CTM2	PBCAR0191 (GMP)	9.6e9	114
CTM3	PBCAR0191 (GMP)	8.3e9	100

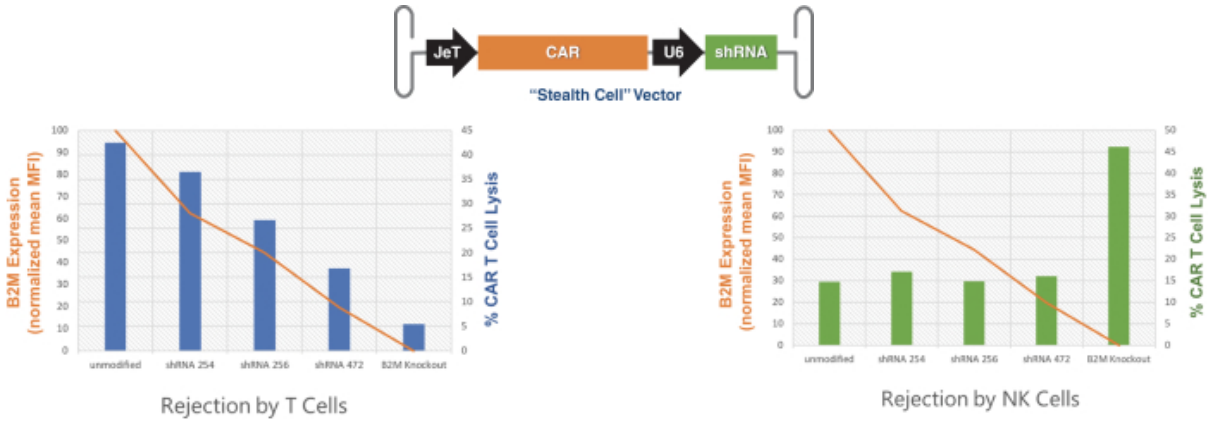
In order to maximize the potential of our CAR T cell platform, we have developed extensive in-house capabilities to support the entire process, from discovery to manufacturing, including:

- A fully human antibody platform for the production of novel CAR binding domains.

- A proprietary collection of costimulatory signaling domains that, if incorporated into a CAR, induce the cell to multiply in response to exposure to cancer cells.
- A high-throughput method for screening new CARs to evaluate their cancer killing activity and target specificity.
- ARCUS for knocking genes out or in to optimize the genetics of our CAR T cells.
- An in-house adeno-associated virus, or AAV, platform for the production of CAR-encoding AAV vectors.
- An in-house mRNA platform for the production of ARCUS-encoding mRNA.
- An in-house animal facility with real-time tumor imaging capabilities.
- Proprietary cytometry panels, potency assays and other bioanalytics for product quality control and release.
- Proprietary manufacturing process for large-scale production of GMP CAR T cells.
- In-house GMP manufacturing facility expected to be completed in the second half of 2019.

Preventing CAR T cell rejection

A patient's immune system is expected to recognize allogeneic CAR T cells as foreign and destroy or reject the cells. This rejection could limit the efficacy of the CAR T therapy if the cells do not persist long enough in the patient to eradicate the tumor. Patients who receive CAR T therapy are typically preconditioned prior to being given the cell therapy using lympho-depleting drugs such as cyclophosphamide or fludarabine, which significantly suppress the immune system of the patient. We believe that this degree of preconditioning will be sufficient to prevent CAR T cell rejection by patients receiving our CAR T treatments. Nonetheless, to help mitigate this risk, we intend to evaluate multiple lymphodepletion regimens in our planned Phase 1/2a clinical trial of PBCAR0191 in patients with R/R B-cell precursor ALL and R/R NHL. Standard cyclophosphamide/fludarabine preconditioning is optimized for autologous CAR T but higher concentrations of the drugs have been delivered safely to patients. Therefore, in the event that we observe PBCAR0191 CAR T cell rejection following standard lymphodepletion, we plan to switch to a more intense cyclophosphamide/fludarabine preconditioning protocol. If this approach is still not sufficient to enhance CAR T cell persistence, we plan to incorporate an additional piece of our technology that we call "stealth cell" into the product candidate. The stealth cell technology is a modified CAR T vector that is designed to suppress a gene called beta-2-microglobulin, or B2M, in CAR T cells using a short-hairpin RNA, or shRNA. In preclinical studies, we and others have observed that suppression or elimination of B2M reduces the rejection of CAR T cells by T cells from an unrelated individual. However, we have found that complete elimination of B2M, for example by knocking the gene out using gene editing, provokes rejection of the CAR T cells by an alternative immune cell called natural killer, or NK. As shown in the figure below, in preclinical studies, we have observed that suppression of B2M to a level that is approximately 5% to 20% of normal levels can significantly reduce rejection by T cells without inducing an NK response. We are currently developing stealth cell versions of our anti-CD19, anti-CD20 and anti-BCMA CAR T vectors.



Our allogeneic CAR T immunotherapy pipeline

We plan to leverage our CAR T cell platform to develop product candidates against validated CAR T cell targets in the near term. By focusing on vetted targets, we seek to avoid many technical hurdles associated with early clinical development and can validate our allogeneic platform in patients with fewer variables. This approach also allows us to leverage the abundance of available public resources for these targets, including CARs, cell and animal models, and clinical protocols. In parallel to advancing product candidates for validated CAR T cell targets, we are performing early-stage research on more challenging solid tumor targets for which the quality and efficiency of the genome editing is expected to be critical for success. Therefore, we expect that we will gradually shift from a focus on validated liquid tumor targets to more challenging solid tumor targets.

The first four product candidates in our CAR T cell development pipeline are:

- **PBCAR0191**. We are developing PBCAR0191 as an allogeneic anti-CD19 CAR T cell product candidate for the treatment of R/R B-Cell precursor ALL and R/R NHL. CD19 is a protein that is expressed on the surface of B cells. It is a well-validated target for CAR T cell therapy and the two currently marketed autologous CAR T cell products also target CD19. In February 2016, we entered into the Servier Agreement, pursuant to which we have agreed to develop allogeneic CAR T cell therapies for CD19 and up to five additional unique antigen targets selected by Servier.

  Our accepted IND for PBCAR0191 included data from three preclinical studies in mice aimed at establishing therapeutic efficacy. The first of these studies was an *in vitro* potency assessment. In this study, the potency of PBCAR0191 CAR T cells was evaluated by measuring cell proliferation, cytotoxic killing, and production of effector cytokines in response to co-culture with CD19+ or CD19- target cells in mice. PBCAR0191 CAR T cells generated from three different donors were observed to proliferate in response to stimulation by CD19+ target cells including Raji (human Burkitt lymphoma), NALM/6 (human acute lymphoblastic leukemia) and K19 (K562 myelogenous leukemia cells transfected to express human CD19) at a wide range of doses (effector to target ratios ranging from 10:1 to 1:10). These observations show that, in this study, PBCAR0191 cells became activated by and killed CD19+ cells at a wide range of cell doses. In this study, we observed that PBCAR0191 cells did not proliferate in response to cells that lack CD19 (co-culture with gene-edited CD19 negative NALM/6 tumor targets or CD19 negative cell lines of myelogenous leukemia or histiocytic lymphoma). Further, we observed T cell receptor knockout control T cells generated from the same donors did not proliferate in response to CD19+ target cells.

  We further evaluated PBCAR0191 in a pair of *in vivo* studies in mice. As shown below, PBCAR0191 was observed to prolong survival in mouse models of leukemia and lymphoma at multiple doses. The pharmacokinetics of PBCAR0191 were evaluated by counting CAR T cells in the blood, marrow, or spleen during the lymphoma study. PBCAR0191 was observed to be well-tolerated in these studies and no adverse events were observed.

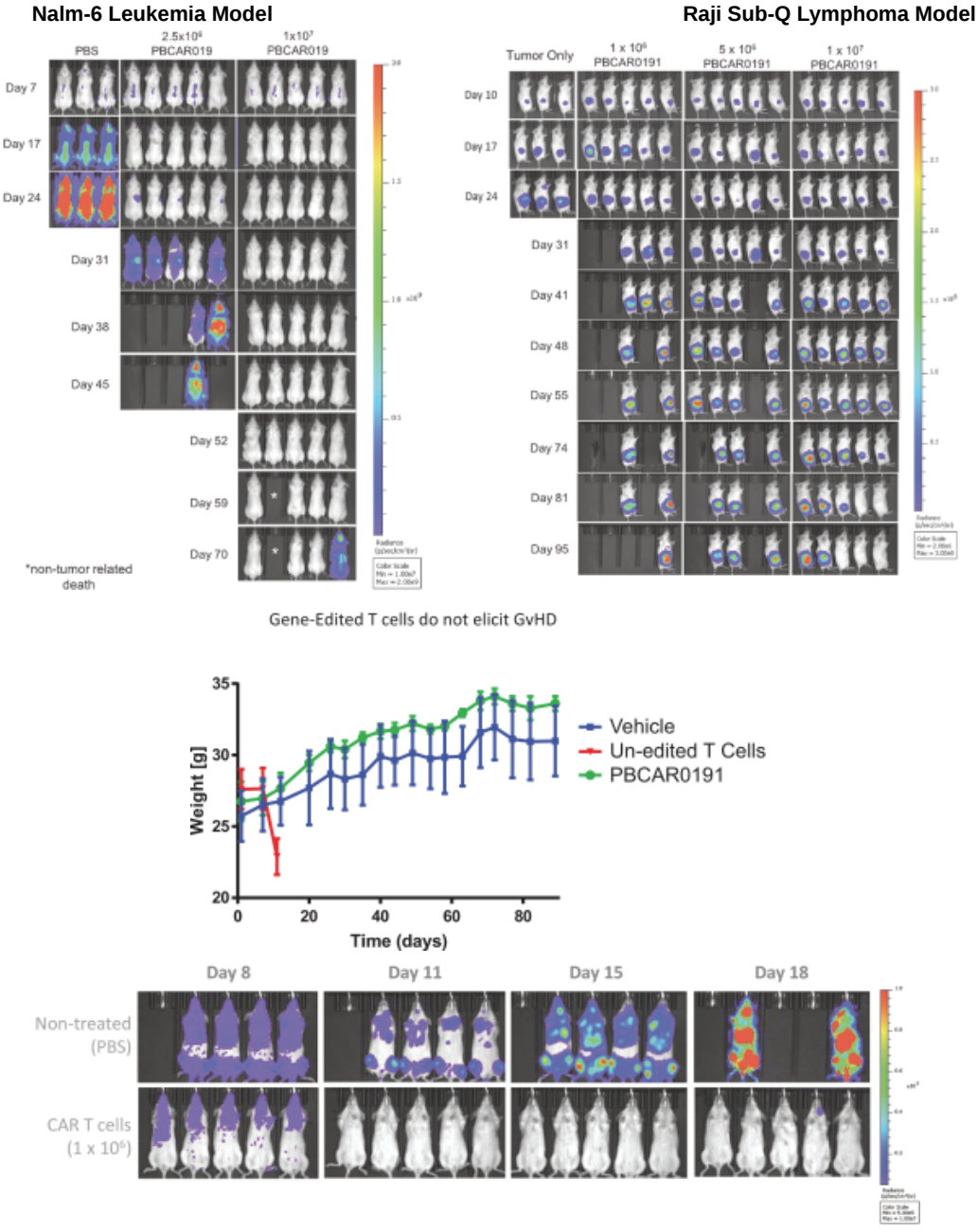
  We have also assessed the safety of PBCAR0191 in four preclinical studies in mice. First, the potential of PBCAR0191 to elicit GvHD was assessed in an *in vitro* study in which we observed that gene-edited PBCAR0191 cells, unlike natural T cells, showed only a minimal amount of proliferation when co-cultured with dendritic cells from an unrelated donor, suggesting that PBCAR0191 cells do not appear capable of killing CD19- cells from a different person and will not be expected to elicit GvHD as a result.

  The potential for GvHD was further assessed *in vivo* in a mouse xenograft model. As shown below, $3x10^7$ PBCAR0191 cells (or $3x10^7$ natural peripheral blood mononuclear cells) were infused into an immunodeficient mouse. Mice were monitored for weight loss and survival. In this study, we observed that PBCAR0191-treated mice gained weight at the same rate as the control group and were healthy for the duration of the study, whereas the peripheral blood mononuclear cell-injected animals lost weight and would not have survived the study.

  The third safety study was a karyotype analysis in mice. No clonal chromosomal abnormalities were observed in 100 metaphase spreads from three different donors, showing that PBCAR0191 cells did not have a high frequency of chromosome abnormalities that may cause tumorigenesis in this study.

  Finally, the potential for tumorigenicity was evaluated using an interleukin, or IL-2 independent growth assay. IL-2 independent growth is a standard test for T cell tumorigenesis. PBCAR0191 cells produced from three different donors continued to proliferate when IL-2 was added to the culture media with a decline in proliferative capacity observed in excess of ten days. In contrast, PBCAR0191 cells cultured in the absence of exogenous IL-2 did not exhibit continued proliferation, and by 14 days of culture in the absence of IL-2 viable

PBCAR0191 cells could no longer be detected in the sample. Thus, PBCAR0191 cells were not observed to be tumorigenic in this study. Taken together, we believe that these studies support the further development of PBCAR0191.

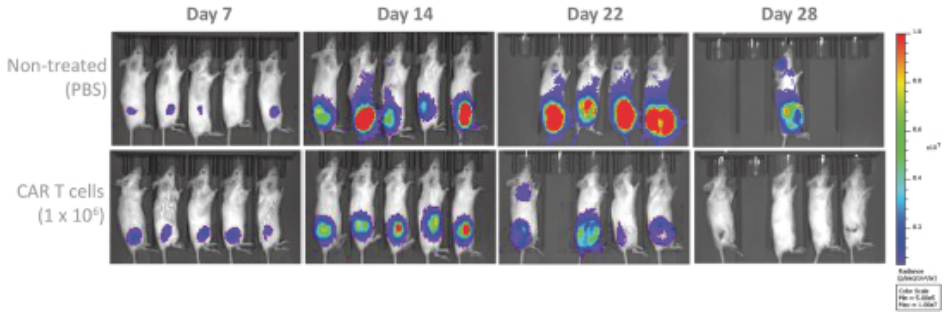


We are currently screening patients for our planned Phase 1/2a clinical trial in patients with R/R B-cell precursor ALL and R/R NHL and expect to dose our first patient in this trial in April 2019. The primary objective of this trial is to evaluate the safety and tolerability of PBCAR0191, as well as to determine the maximum tolerated dose. Secondary objectives will include evaluating the anti-tumor activity of PBCAR0191. We will also evaluate the expansion, trafficking and persistence of PBCAR0191 in this trial. We expect to enroll a total of 9-18 patients in the Phase 1 portion of this trial in both the ALL and the NHL cohorts and we will investigate up to three dose levels: 3.0 x 10^5 cells/kg, 1.0 x 10^5 cells/kg and 3.0 x 10^6 cells/kg. Patients will be further evaluated for a follow-up period of 11 months. The trial will be conducted at four clinical sites across the United States. We expect to report interim data results from this trial in early 2020.

- **PBCAR20A.** We are developing PBCAR20A as an allogeneic anti-CD20 CAR T cell product candidate for the treatment of Chronic Lymphocytic Leukemia, or CLL, and Small Lymphocytic Lymphoma, or SLL. Like CD19, CD20 is a protein expressed on the surface of B cells. It is an established target for cancer treatment and several CD20-targeted therapies, such as the monoclonal antibody Rituxan, have long histories of clinical success. Because CD19 and CD20 are expressed on similar cell types, PBCAR20A will also be evaluated as an option for leukemia/lymphoma patients who relapse with CD19-negative disease following autologous anti-CD19 CAR T failure. Success in this patient population would potentially enable a combination product comprising both PBCAR0191 and PBCAR20A. We have selected a development candidate for our anti-CD20 CAR T cell product and IND-enabling efficacy and toxicology studies are underway.

  We have conducted a preclinical study in PBCAR20A in mice to measure cell proliferation, cytotoxic killing, and production of effector cytokines in response to co-culture with CD20+ or CD20- target cells. PBCAR20A CAR T cells were observed to proliferate in response to stimulation by CD20+ K20 cells (K562 myelogenous leukemia cells transfected to express human CD20) at a wide range of doses (effector to target ratios ranging from 1:1 to 9:1). These observations show that, in this study, PBCAR20A cells became activated by and killed CD20+ cells at a wide range of cell doses. In this study, we observed that PBCAR20A cells did not proliferate in response to co-culture with CD20 negative cell K562 cells.

  We also evaluated the potency of PBCAR20A *in vivo*. As shown below, PBCAR20A was observed to prolong survival in a mouse model of lymphoma (Raji Sub-Q model) at both doses tested (1 x 10^6 and 5 x 10^6 cells per mouse), which we believe supports further development. PBCAR20A was observed to be well-tolerated in this study.

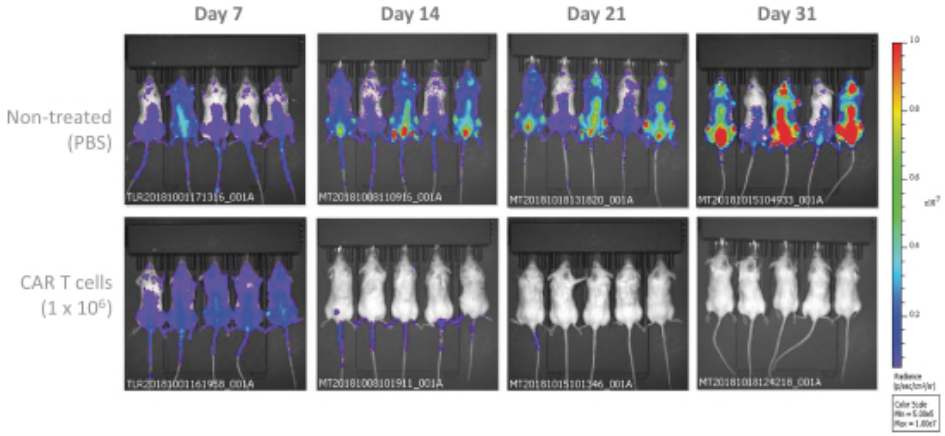


  We anticipate submitting an IND to the FDA for PBCAR20A in the fourth quarter of 2019 and commencing a Phase 1 open-label, multi-center, dose escalation clinical trial in patients with R/R CLL.

- **PBCAR269A.** We are developing PBCAR269A as an allogeneic anti-BCMA CAR T cell product candidate for the treatment of multiple myeloma. BCMA is a protein that is expressed on the surface of mature B cells called “plasma cells” that are responsible for the disease and is a validated CAR T cell target. We have selected a development candidate for our anti-BCMA product.

We evaluated the potency of PBCAR269A CAR T cells in a preclinical study in mice by measuring cell proliferation, cytotoxic killing and production of effector cytokines in response to co-culture with BCMA+ or BCMA-target cells. In this study, PBCAR269A CAR T cells were observed to proliferate in response to stimulation by BCMA+ target cells including MM.1S (human multiple myeloma) and KBCMA (K562 myelogenous leukemia cells transfected to express human BCMA) at a wide range of doses (effector to target ratios ranging from 1:1 to 1:8). These observations show that, in this study, PBCAR269A cells became activated by and killed BCMA+ cells at a wide range of cell doses. We further observed that PBCAR269A cells did not proliferate in response to co-culture with BCMA- K562 cells.

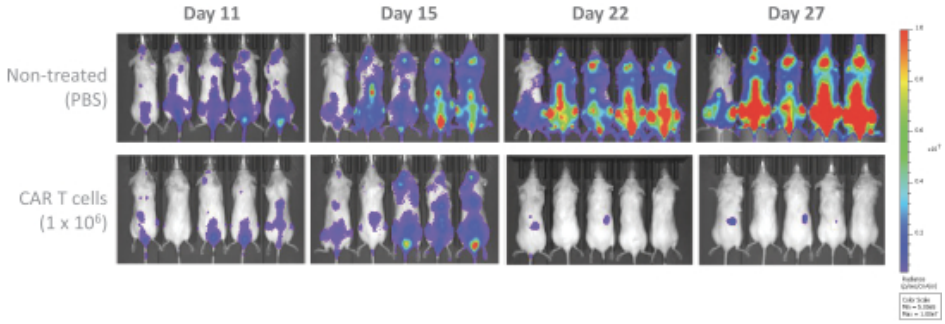
We also evaluated the potency of PBCAR269A *in vivo*. As shown below, PBCAR269A was observed to prolong survival in a mouse model of multiple myeloma, which we believe supports further development. PBCAR269A was observed to be well-tolerated in this study.



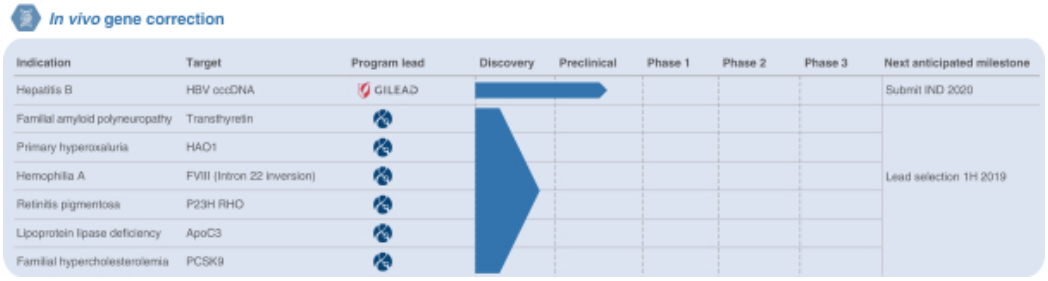
We anticipate submitting an IND to the FDA for PBCAR269A in 2020 and commencing a Phase 1 open-label, multi-center, dose-escalation clinical trial in patients with R/R multiple myeloma.

- **PBCAR371A.** We are developing PBCAR371A as an allogeneic anti-CLL-1 CAR T cell product candidate for the treatment of acute myeloid leukemia, or AML. CLL-1 is a protein that is expressed on myeloid cells, including many AML cancer cells. We believe AML represents a significant unmet need.

We are currently evaluating multiple anti-CLL-1 therapeutic candidates for *in vitro* and *in vivo* potency in mice to identify a candidate for preclinical development. As shown below, multiple candidates have already been identified that efficiently kill the AML cell line HL-60 *in vitro* and in mice and have been observed to be well tolerated. We anticipate submitting an IND to the FDA for PBCAR371A in 2020 and commencing a Phase 1 open-label, multi-center, dose-escalation clinical trial in patients with R/R AML.



Our *in vivo* gene correction platform



Overview

We expect *in vivo* genome editing to be a significant focus of our operations long-term because the differentiated attributes of ARCUS are particularly advantageous for this type of application. *In vivo* gene correction involves the delivery of ARCUS nucleases directly into a patient's cells to treat disease at the level of the underlying DNA. *In vivo* genome editing is more complex and challenging than *ex vivo* approaches like CAR T cells due to the need to safely deliver ARCUS directly to cells in the body. We believe that *in vivo* applications are particularly well suited to ARCUS because they require extremely low levels of off-target editing and efficient delivery.

Due to the demands of *in vivo* editing, we are taking a highly disciplined approach to managing our project portfolio that emphasizes studies in large animals, using both viral and non-viral delivery technologies. We believe that there is a remarkable lack of large animal data in the genome editing field and that demonstrating safety and efficacy in large animals is an important gating step prior to beginning human clinical studies. Thus, we are advancing an extensive and diverse portfolio of programs toward *in vivo* efficacy and toxicity studies and are generating a large animal dataset that, we believe, will be the most comprehensive of any in the field.

Treatment of genetic disease

Genetic diseases are caused by errors in the DNA that lead to misfunction of a cell or tissue. While the underlying cause of a particular genetic disease can often be complex and variable, DNA errors generally fall

into two categories: loss-of-function or gain-of-function. Genetic diseases are most frequently caused by loss-of-function errors in which a particular gene is mutated at the DNA level in such a way that it is either non-functional or less functional than it should be. In these cases, treating the disease requires *adding* the function that the cell or tissue is otherwise lacking. Gain of function genetic disorders are the result of DNA errors that cause a gene to acquire a new, harmful function that leads to disease. In these cases, it is necessary to remove the unwanted function to treat the disorder.

Genetic disease is a very active area of therapeutic development, and the therapies that are available or in development are, to a large extent, as variable and specialized as the diseases themselves. There are, however, two gene therapy platform approaches that are being broadly applied to the treatment of multiple genetic disorders. For the treatment of loss-of-function diseases, AAV-based gene therapy can often be an effective treatment. AAV is a non-integrating virus that can be used to deliver DNA to a wide range of different cell types in a patient. The virus can be engineered to deliver a functional copy of a gene that is otherwise missing or under-performing in the cell. This approach can, in some cases, restore normal function to the cell and alleviate the symptoms of the disease.

While a number of AAV-based gene therapies appear to be showing great promise in clinical trials, the approach is subject to a number of limitations. Many patients have antibodies in their blood that recognize and inactivate the AAV virus before it can deliver the DNA into the patient's cells. In addition, among patients who do *not* have antibodies upon initial treatment with the virus, most will develop antibodies following the first dose. Therefore, in most cases, it is only possible to dose a patient one time. Most importantly, although AAV-based gene therapy can be an effective treatment, it is probably not a permanent *cure* because AAV-delivered genes do not generally persist for more than a few years in the body. While the duration of virus persistence varies from cell-to-cell and from patient-to-patient, it is not believed to be permanent and symptoms of the disease can return once the virus is no longer present in the body.

A second platform gene therapy approach, RNA interference, or RNAi, has been shown to be an effective treatment strategy for many gain-of-function genetic disorders. These therapies usually take the form of a small-interfering RNA, or siRNA, which is a short piece of synthetic RNA that can "silence" or partially inactivate a deleterious gene if it is delivered to a cell in sufficient quantities. Therapeutic siRNA is most frequently used to silence genes with gain-of-function mutations that are expressed in the liver. This is because the siRNA molecules can be delivered efficiently to liver cells following IV infusion using a variety of different delivery approaches. Like AAV-based gene therapy, the primary limitation of RNAi approaches is that they lack permanence. siRNA drugs have a limited lifetime and, therefore, must be administered repeatedly for the life of the patient in order to be effective. While longer half-life siRNA drugs are showing persistence for up to six months, we believe there is a need for therapeutic options that untether the patient from regular drug treatments by addressing the underlying cause of the disease.

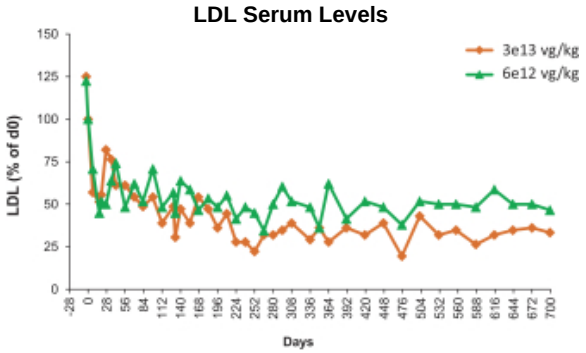
Our approach to* in vivo *gene correction

Our goal is to cure genetic diseases by correcting the DNA errors responsible for causing them. In principle, *in vivo* genome editing can likely be used to cure any genetic disorder. In practice, however, *in vivo* genome editing is limited by several challenges that, we believe, are best addressed using ARCUS:

- **Specificity.** *In vivo* genome editing requires an extremely high degree of precision to minimize the occurrence of any unwanted off-target editing. Off-target changes to the DNA could, potentially, have significant safety implications that may not manifest themselves until well after administration of the therapy. As enumerated above, we believe that the differentiated attributes of ARCUS enable us to create endonucleases that have a high degree of specificity and minimal levels of off-target editing to address this significant safety concern.

- **Delivery.** Gene delivery technologies suitable for the delivery of genome editing endonucleases to tissues *in vivo* have not been developed for all tissues. Delivery challenges are particularly pronounced for editing applications that require promoting DNA repair by HDR because it is necessary to deliver both the nuclease and the DNA "donor" template for HDR. We have focused our initial development efforts on genetic disorders of the eye and liver, two tissues for which we believe we have good options for delivery and in which we have shown ARCUS to be effective in preclinical studies. We believe the small size of our ARCUS nucleases and their ability to efficiently promote HDR will enable us to address a greater variety of genetic diseases requiring more complex delivery strategies.
- **Efficiency.** Genome editing efficiency is a critical parameter for *in vivo* therapeutic efficacy because the requisite edit must be achieved in a sufficient number of cells to have therapeutic benefit. Efficiency is best measured *in vivo* in animals because it is affected by multiple parameters including delivery, endonuclease activity and the accessibility of the DNA target site in the organism. Moreover, we believe that only large animals such as non-human primates accurately model these different parameters and are representative of the human condition. As such, we have placed a good deal of emphasis on large animal studies and have demonstrated, we believe, therapeutic levels of editing efficiency using ARCUS in the most relevant models. This gives us greater confidence that ARCUS will translate from the lab bench to the clinic.

The potential of ARCUS for *in vivo* genome editing is highlighted in a July 2018 publication in *Nature Biotechnology* that describes a research project performed as part of a sponsored research collaboration between our company and Dr. Jim Wilson's Orphan Disease Center at the University of Pennsylvania. Co-authors of the publication include Derek Jantz and Jeff Smith, two of our co-founders. This publication is, to our knowledge, the first peer-reviewed publication of *in vivo* genome editing data in non-human primates. We reported well-tolerated, long-term, high-efficiency editing of the PCSK9 gene in non-human primates using ARCUS. A single IV administration of an AAV vector encoding a PCSK9-specific ARCUS nuclease was able to efficiently knock out the gene in the livers of Rhesus macaques, a species of monkey, resulting in up to approximately 85% reduced levels of PCSK9 protein in the blood. This reduction in PCSK9 then resulted in significantly reduced levels of LDL-C, commonly known as "bad cholesterol," in the blood of treated animals. Because this therapeutic effect is due to modifications to the DNA itself, the benefit of the treatment appeared to be permanent. The first animals that were treated have maintained reduced levels of PCSK9 and LDL-C since they were treated in February 2017. Importantly, even at the highest dose the treatment was observed to be well tolerated in the study. These peer reviewed data exemplify the power of ARCUS for *in vivo* editing at therapeutically meaningful levels of efficiency.



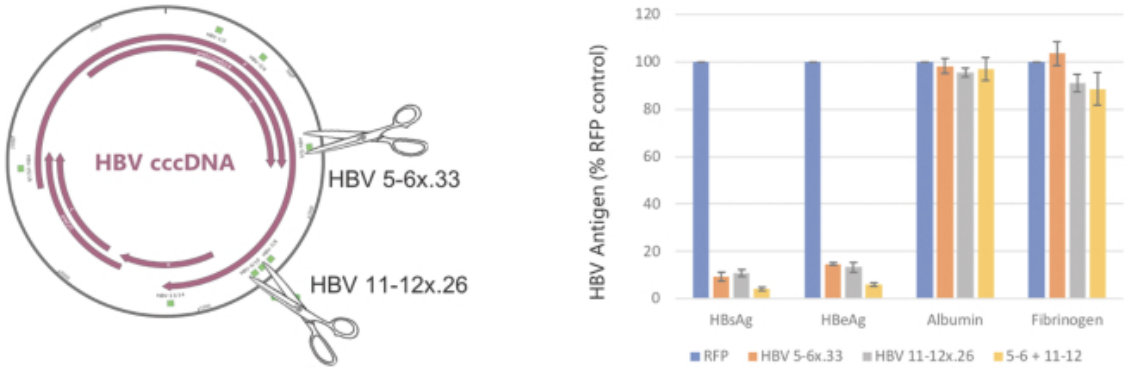
We believe that establishing collaborations with other groups that have domain expertise and access to the most relevant animal models will be important to advancing our *in vivo* gene correction platform, and we have

entered into a number of collaborations and licensing agreements with third parties to help us advance our *in vivo* editing portfolio. In particular, in September 2018 we announced a sponsored research agreement with the Orphan Disease Center at the University of Pennsylvania. This organization, led by Dr. Jim Wilson, is dedicated to curing rare genetic diseases and has access to unique expertise and resources, including AAV vector production and non-human primate models. Several of our liver-directed projects are being conducted in collaboration with Dr. Wilson under this agreement.

Hepatitis B program

In September 2018, we announced a partnership with Gilead to co-develop an ARCUS-based treatment for chronic Hepatitis B infection. Infection by the Hepatitis B Virus, or HBV, is in many ways analogous to a gain-of-function genetic disorder. In this case, the deleterious DNA that needs to be eliminated is the genome of the virus itself. To this end, we are collaborating with Gilead to develop an ARCUS-based product candidate that is designed to specifically target and eliminate virus DNA, either integrated or cccDNA, from infected liver cells. We intend to submit an IND to the FDA in 2020 for this product candidate.

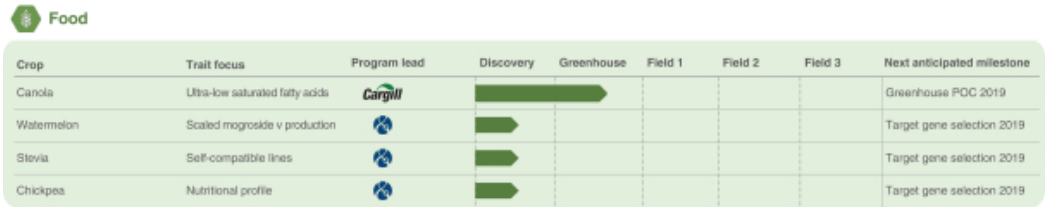
In preclinical studies, we developed a pair of ARCUS nucleases called “HBV 5-6x.33” and “HBV 11-12x.26” that recognized and cut conserved DNA sequences in the Hepatitis B genome. We observed that these nucleases, if administered to HBV-infected primary human hepatocytes, selectively eliminated virus DNA from the cells. As shown below, this resulted in a loss of the virus-produced antigens HBsAg and HBeAg from the culture without affecting the expression of normal hepatocyte genes.



We believe that our proprietary ARCUS genome editing platform, strong collaborations and a disciplined approach to preclinical development that emphasizes large animal studies will help position us to unlock the enormous potential of therapeutic *in vivo* editing.

We are also in the discovery stage for other *in vivo* indications: familial amyloid polyneuropathy, primary hyperoxaluria, hemophilia A, retinitis pigmentosa, lipoprotein lipase deficiency and familial hypercholesterolemia. We intend to select an indication and target for our next *in vivo* product candidate in the first half of 2019.

Our food platform



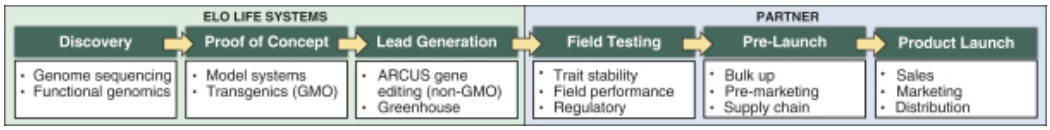
Technology-centric solutions to meet changing demands in food and agriculture

The total global food and agriculture market, estimated to be at $5 trillion (2015), is heavily influenced by the availability of critical raw material ingredients and changing consumer behavior. With the global population projected to reach 8.5 billion by 2030, demand for basic food and nutrition needs has already put a lot of pressure on traditional food production systems. In response, the food and agriculture industry is currently in the process of a slow, but massive, repositioning effort to reinvent its capital-intensive infrastructure, complex business structures and product pipelines. This is creating new opportunities to disrupt the otherwise archaic food industry by introducing technology solutions that address unmet needs. Of particular concern to the industry is the agronomic impact of climate change. Many staple foods and critical ingredients, such as citrus, bananas and coffee, are under threat from environmental changes and the new pathogens it can bring. The food and agriculture industry has also seen significant shifts in consumer preferences in which consumers are actively transitioning to high quality and healthier foods and beverages, while rejecting artificial ingredients, sugar and salt, creating a demand for natural and holistic ingredients built on a sustainable supply chain. Traditional approaches to agricultural innovation are slow, siloed, rely heavily on non-scalable academic advancements and continue to use inefficient crop improvement practices. We believe that many of the current pressures on the food and agriculture industry from climate-related threats and changing consumer preferences can be effectively addressed using biotechnology. However, consumers are generally opposed to genetically modified organisms, or GMOs, which makes food companies reluctant to incorporate them into their products. Elo was created to help food companies “thread the needle” between competing pressures to improve the genetics of their ingredients while avoiding the incorporation of GMO organisms.

Elo Life Systems: Innovation-focused technology platform and business model

Elo Life Systems is our wholly owned subsidiary, dedicated to addressing the needs of consumers and consumer-facing industries in the food and agriculture sector. Our business model is heavily partner-focused. In the food and agriculture industry, timelines to market are long and the field is dominated by a relatively small number of entrenched companies. Therefore, it is a very difficult to bring a product to market without a larger partner. Thus, we seek partnerships early in the product development process to optimize our chances of market success. Under this partnership model, we are responsible for the early phases of the project, starting from concept through production of a “lead,” which is typically a gene edited plant that has the desired trait in greenhouse testing and is ready for scale-up and testing in the field. At that point, our partners typically assume responsibility for subsequent development and commercialization. Because large consumer-facing food companies are often not directly responsible for producing their own starting ingredients, this transfer may involve an intermediate in the supply chain such as a seed producer or grower who is responsible for pre-commercial activities. Whenever possible, we try to partner with the entire supply chain early in the project to ensure a smooth transition across phases of development. In general, our partners are responsible for financing all or a portion of our development costs, which greatly reduces our capital requirements. We are

then generally eligible to share in revenues derived from successfully commercialized products developed under these partnerships.



Elo's technology platform

Our end-to-end food platform is built to support rapid innovation across multiple crop species. With the ARCUS genome editing platform as our cornerstone technology, we have integrated complementary tools and technologies both upstream and downstream to potentially be a complete solutions provider.

At the core of our food platform is our ARCUS editing technology. We are one of the first to apply genome editing technology to crop plants and we believe we have the most in-depth experience in crop genome editing in the industry. Over the last decade, we have developed highly efficient methods to improve delivery and functionality of ARCUS nucleases in plants to edit DNA. These nucleases have been successfully validated in collaborative projects with major food and agriculture companies like Cargill, BASF, Bayer CropScience and DuPont Pioneer Hi-bred. Importantly, ARCUS can be used to create small deletions or insertions in plants using a non-plant pest- or pathogen-based delivery approach. As such, we believe that many of the food and agriculture product candidates we may develop have the potential to obtain nonregulated status in the United States and other territories and thereby avoid GMO labels. This aspect of the technology platform is critical to food producers, particularly as they respond to consumer demands for healthier products. Because Elo partners with large companies that generally lack significant biotechnology capabilities, it was necessary for us to build these capabilities in-house to complete Elo's portion of the development process. This end-to-end platform is unusual in the industry and, we believe, makes Elo an attractive partner. In addition to ARCUS, Elo's in-house capabilities include:

- **Genomics.** Many of the most attractive opportunities for Elo involve emerging and under-studied crops, such as stevia and monk fruit. We have integrated genome sequencing and bioinformatic platforms in-house in order to identify the genome sequence of plants, enabling us to identify targets for editing with ARCUS nucleases.
- **Target discovery and validation.** Our informatics platform is built on principles of machine learning that allow us to synthesize, sequence and phenotype information from both public and internal datasets to correlate genome sequence with plant characteristics. This allows us to identify genetic targets for ARCUS editing that are predicted to yield a desired phenotype. These targets can then be validated in specific crops and at least partially validated in model systems such as tobacco and Arabidopsis using different molecular approaches such as editing or RNAi.
- **Multi-crop transformation.** Most of the crops of interest to Elo and our partners do not have established transformation protocols and are not readily amenable to gene editing. To this end, we have developed a sophisticated collection of plant transformation vectors and protocols over the last decade that allow us to rapidly develop gene-edited variants of otherwise intractable species. This technology allows us to overcome what is otherwise a significant barrier to entry into a new crop species.
- **Plant growth infrastructure.** Elo has a dedicated facility and capabilities of cultivating gene edited plants from incubator to greenhouse.

Ultra-low saturated fatty acid canola oil (in collaboration with Cargill Inc.)

Canola oil is the third largest vegetable oil by volume after palm and soybean oil. In the United States, canola oil is one of the most widely consumed oils, second only to soybean oil. With worldwide production at 30 million metric tons in 2017, the global canola oil is estimated to be a $20 billion industry.

Cargill is one of the world's largest growers and processors of canola. Since 2014, Elo and Cargill are engaged in a collaboration to produce ARCUS-optimized canola varieties and have achieved significantly lower levels (less than 4.5%) of saturated fatty acids compared to the current levels (7%) in greenhouse studies. This oil with the desirable premium trait is intended for the quick-service restaurants and food ingredients industries, and products made with it—particularly fried foods—may be able to use front-of-package nutrient content claims on saturated fat levels, such as "Low in Saturated Fat" or "No Saturated Fat," depending on their overall nutritional profile.

This program has generated canola varieties with up to an approximately 33% decrease in total saturated fats compared to un-edited varieties in greenhouse studies and we have not observed any less desirable traits in these canola varieties in these greenhouse studies to date. We expect to commence Field 1 trials in 2019.

Low-calorie sweeteners from stevia and monk fruit

Low calorie sweeteners are a rapidly growing segment of the food and beverage industry as companies respond to consumer demands for low-sugar snack foods and soda alternatives. In addition, the adoption of "sugar taxes" by many cities across the United States and Europe are significantly impacting profit margins and creating an acute need for alternatives to cane sugar and corn syrup such as the natural, high intensity sweeteners in stevia and monk fruit.

Over the past decade, stevia has emerged as a preferred low-calorie sugar substitute. However, stevia is subject to a number of disadvantages, including undesirable aftertaste, complex biology, unsustainable production practices and supply chain issues. Self-incompatibility, or a genetic condition that prevents self-fertilization and promotes outcrossing for flowering plants, has been identified as one of the main impediments to improving stevia as a crop. We are working to produce self-compatible stevia lines suitable for breeding and domestication. We believe that changing this property of stevia will enable new breeding strategies that will allow Elo and its partners to rapidly domesticate and improve the crop.

We believe that the best low calorie sweetener comes from monk fruit. The monk fruit compound mogroside V is approximately 300 times sweeter than cane sugar and has been identified as an excellent alternative to cane sugar and stevia. Monk fruit is a low biomass species that grows exclusively in southeast Asia and is frequently harvested and processed using questionable labor practices. This makes mogroside V expensive, difficult to obtain and controversial. However, monk fruit is closely related to watermelon and the genes encoding all components of the mogroside V pathway are present, though inactive, in watermelon. We are currently collaborating with a large beverage company to re-activate the latent mogroside V pathway in watermelon to produce this high value metabolite in a crop that is readily cultivated across North America and Europe.

Plant-based proteins

Shifting consumer preferences across the globe towards higher protein diets has created unprecedented demand for plant-based protein sources. We do not believe that this demand for plant-based proteins, projected to grow to a $10.5 billion global industry by 2020, can be met without the application of biotechnology to increase protein content in different crop species.

In November 2018, we launched Elo Life Systems Australia, a subsidiary of Elo that will support research programs in Australia. Elo Life Systems Australia's primary focus is developing improved protein and nutritional profiles in legumes starting with chickpea. We aim for the resulting products to make a significant contribution towards the increasing demand for sustainable plant-based proteins as a healthful alternative to animal protein.

Citrus varieties resistant to Citrus Greening Disease

Citrus greening is one of the most serious citrus plant diseases in the world. Rising global temperatures have shortened the life cycle of the insect pests that carry the citrus greening pathogen and enabled rapid spread of the disease to most citrus producing areas of the world. Infected trees produce fruits that are unsuitable for sale as produce, and once a tree is infected, there is no cure. In the state of Florida alone, the economic impacts of citrus greening since the disease was first detected in 2005 were estimated at a loss of more than $8 billion.

At Elo, we are leveraging recent insights into citrus-pathogen interactions to generate novel citrus varieties with resistance to citrus greening. Our citrus greening program is designed to utilize ARCUS nucleases to disrupt plant-pathogen interactions to, we believe, generate non-GMO, citrus greening resistant trees. Citrus greening is one of many examples of how the food industry was caught off-guard by the impact of global warming.

Manufacturing

We currently contract with third parties for the manufacturing of materials used in the production of our product candidates. To date, our third-party manufacturers have met our manufacturing requirements. We believe that there are alternate sources of supply that can satisfy our requirements.

The manufacturing process for our allogeneic CAR T immunotherapy platform utilizes a one-step cell engineering method in which a CAR gene is targeted directly into the T cell receptor alpha constant, or TRAC, locus. We believe this approach greatly streamlines the manufacturing process. Commercial raw materials and reagents for this production are readily available. Our manufacturing strategy for our *in vivo* gene correction platform and our food platform is to internally control process development and manufacturing to safeguard the proprietary nature of our technology and facilitate our ability to function as an integrated life sciences company.

We are building strong internal scientific process development and manufacturing capabilities, including investing in building a cGMP-compliant manufacturing facility to support our therapeutic product development platforms. We believe that having internal manufacturing capacity and expertise will be a competitive advantage that enables enhanced control over process development timelines, costs and intellectual property.

We are in the process of building a cGMP-compliant manufacturing facility. We have leased approximately 17,300 feet of space for our manufacturing facility at a location approximately seven miles from our headquarters in Durham, North Carolina. We expect to have a modular, three suite cleanroom setup, for CAR T cell, mRNA and AAV production, to process development for our allogeneic CAR T immunotherapy platform. We expect that our manufacturing facility will leverage single use, disposable, closed system operations aligned to our technology platforms to ensure both flexibility and cost effectiveness. The initial scope will be for preclinical through Phase 1/2a manufacturing. We expect the facility to be operational in the second half of 2019.

License and collaboration agreements

Servier

In February 2016, we entered into the Servier Agreement with Baxalta (now Shire). This agreement was assigned to Servier in connection with Servier's acquisition of Shire's oncology business in August 2018. Pursuant to this agreement, we have agreed to develop allogeneic chimeric antigen receptor T cell therapies for

up to six unique antigen targets, the first of which was selected by Baxalta at the inception of the agreement and the remaining five of which may be selected by Servier over the first four years of the agreement. Upon selection of an antigen target, we perform early-stage research and development on individual T cell modifications for the selected target, develop the resulting therapeutic product candidates through Phase 1 clinical trials and manufacture clinical trial material for use in Phase 2 clinical trials.

We received an upfront payment of $105.0 million under the Servier Agreement. At Phase 2 readiness for any product candidate covered by the Servier Agreement, Servier may exercise a commercial option to proceed with development and commercialization of the product candidate, subject to option fees. Following the exercise of any such commercial option, Servier must use commercially reasonable efforts to develop and commercialize the product candidate. We have the ability to receive total payments, including the upfront payment, option fees and milestone payments, in the aggregate across all six targets that may be selected, of up to approximately $1.6 billion. This includes up to $1.5 billion in milestone payments, consisting of up to $401.3 million in development milestone payments and up to $1.1 billion in commercial milestone payments. We are also entitled to receive tiered royalties ranging from the mid-single digit percentages to sub-teen percentages on worldwide net sales of any products developed under the Servier Agreement, subject to customary potential reductions. Servier's obligation to pay royalties to us expires on a country-by-country and licensed product-by-licensed product basis upon the latest of (1) the expiration of the last to expire valid claim of all Precision patents covering a licensed product, (2) expiration of all regulatory exclusivity with respect to a licensed product in the applicable country of sale, and (3) the expiration of 10 years following the first commercial sale of such licensed product in such country. We also have the right to participate in the development and commercialization of any licensed products resulting from the collaboration through a 50/50 co-development and co-promotion option in the United States, subject to our payment of an option fee, which is exercisable after Servier's commercial option exercise. So long as Servier holds a commercial license with respect to any particular licensed product, we may not develop, manufacture or commercialize any engineered human T cells with chimeric antigen receptors for use in humans directed to the same antigen target as the target of that licensed product.

Unless terminated earlier, the Servier Agreement expires upon the first to occur of (1) the expiration of the period in which Servier may nominate antigen targets, if there are no included targets under the agreement, (2) the expiration of the period in which Servier may exercise a commercial option on a licensed product candidate, if no commercial options have been exercised by Servier, or (3) the expiration of the last to expire royalty term for the licensed products and satisfaction of all of Servier's payment obligations under the agreement. Servier has the right to terminate the agreement for convenience, either in its entirety or on a target-by-target or product-by-product basis, by providing advance notice to us. We may terminate immediately upon notice to Servier if Servier (itself or through the use of certain affiliates or a third party) or any sublicensee initiates or participates in a patent challenge against our patents licensed by Servier under the agreement. In addition, the Servier Agreement may be terminated (a) by either party for the other party's material breach that remains uncured as specified in the agreement, (b) by either party upon the occurrence of certain insolvency-related events of the other party and (c) upon mutual agreement of the parties in the event either party suffers an event of force majeure as specified in the agreement. If Servier terminates the agreement for our uncured material breach of provisions in the agreement that restrict development, manufacture or commercialization of engineered human T cells with chimeric antigen receptors for use in humans directed to a target selected by Servier, certain licenses we grant to Servier will become royalty-free, fully paid-up, perpetual and irrevocable with respect to the licensed product candidates and licensed products directed to the target that was the subject of such breach, and Servier will be deemed to have previously exercised its commercial option for any then-existing licensed product candidates directed to such target.

Gilead

In September 2018, we entered into the Gilead Agreement to develop genome editing tools using ARCUS to target viral DNA associated with the Hepatitis B virus. Pursuant to the terms of the agreement, Gilead received an exclusive license to exploit the resulting synthetic nucleases and products that use them to treat the Hepatitis B virus in humans, and we are entitled to receive up to approximately $40 million in research funding over an initial three year term and milestone payments of up to an aggregate of $445 million, consisting of up to $105.0 million in development milestone payments and up to $340.0 million in commercial milestone payments. We are also entitled to receive tiered royalties ranging from the high single digit percentages to the mid-teen percentages on worldwide net sales of the products developed through the term of the agreement, subject to customary potential reductions. Gilead's obligation to pay royalties to us expires on a country-by-country and licensed product-by-licensed product basis, upon the latest to occur of certain events related to expiration of applicable patents, expiration of regulatory exclusivity or 10 years following the first commercial sale of the first licensed product in such country.

Unless terminated earlier, the Gilead Agreement will continue, on a licensed-product-by-licensed-product and country-by-country basis until the expiration of a defined royalty term for each licensed product and country. Gilead has the right to terminate the Gilead Agreement for convenience by providing advance notice to us as specified in the Gilead Agreement. Gilead may also terminate the agreement during the collaboration term if we enter into certain change of control transactions with a third party that is clinically developing or commercializing products in the field of the Hepatitis B virus. In addition, either party may terminate the Gilead Agreement (1) for material breach by the other party and a failure to cure such breach within the time period specified in the Gilead Agreement and (2) upon the occurrence of certain insolvency-related events of the other party.

Duke University

In April 2006, we entered into the Duke License, pursuant to which Duke granted us an exclusive (subject to certain non-commercial rights reserved by Duke), sublicensable, worldwide license under certain patents related to certain meganucleases and methods of making such meganucleases owned by Duke to develop, manufacture, use and commercialize products and processes that are covered by such patents, in all fields and in all applications. The patents that we license pursuant to the Duke License have been generated through the use of U.S. government funding and are therefore subject to certain federal regulations. See "Risk factors— Risks related to intellectual property—Some of our in-licensed intellectual property has been discovered through government funded programs and thus may be subject to federal regulations such as "march-in" rights, certain reporting requirements and a preference for U.S.-based companies, and compliance with such regulations may limit our exclusive rights, and limit our ability to contract with non-U.S. manufacturers."

Under the Duke License, in addition to upfront licensing fees, we are also required to pay Duke (1) a total of $0.3 million in milestone payments, a portion of which we paid upon the completion of our Series A financing, a further portion of which we paid upon our first signed partnership in excess of $1 million, and the remainder of which we will be required to pay upon successful commercialization of seed traits and human therapeutics, (2) royalties in the low single digit percentages on net sales of licensed products and licensed processes sold by us and our affiliates, subject to certain reductions in certain circumstances, with certain annual minimum royalties, and (3) certain percentages of sublicensing revenue received under sublicenses granted to third parties, which are creditable against annual minimum royalties and are subject to certain reductions in certain circumstances. For sublicenses of non-commercial products, the percentage of sublicensing revenue payable to Duke is in the mid-teen percentages for sublicense revenues owed from royalties received and low double-digits for sublicense revenues owed from non-royalty payments. For sublicenses of commercial products created by us and derivatives thereof, the percentage is determined by the highest negotiated royalty rate in such

sublicense. If the highest negotiated royalty rate between us and our sublicensee exceeds a mid-single digit percentage, the percentage of sublicensing revenue payable to Duke will be high single digit, decreasing to low single digit as the highest negotiated royalty rate in such sublicense increases. The Duke License will expire upon the expiration of the last-to-expire patent that is licensed to us. We may terminate the Duke License by providing advance written notice as specified in the Duke License. Either party may terminate the Duke License in the event of the other party's uncured material breach or for the other party's fraud, willful misconduct or illegal conduct with respect to the subject matter of the Duke License.

Cellectis S.A.

In January 2014, we entered into a cross-license agreement with Cellectis S.A., which we refer to as the Cellectis License, in connection with a settlement of litigation matters (1) between Cellectis and us and (2) among Cellectis, Duke and us. Cellectis granted us a non-exclusive, sublicensable, worldwide, fully paid, royalty-free license to certain modified I-CreI homing endonuclease patents and Cellectis patents asserted in the litigation, to make, use and commercialize modified I-CreI homing nucleases and products developed using such nucleases, in all fields. The license we received from Cellectis is subject to the rights of a preexisting license agreement that Cellectis entered into with a third party, and the license granted to us excludes any rights exclusively granted by Cellectis under such preexisting license, which preexisting license is limited to certain specific applications unrelated to the fields of human therapeutics and plant agriculture, for so long as the rights under the preexisting license remain exclusive.

We granted Cellectis a non-exclusive, sublicensable, worldwide, fully paid-up, royalty-free license to certain modified I-CreI homing endonuclease patents and our patents asserted in the litigation matters (1) between Cellectis and us and (2) among Cellectis, Duke and us to make, use and commercialize modified I-CreI homing nucleases and products developing using such nucleases, in all fields except those for which we did not receive rights from Cellectis due to the preexisting license.

The Cellectis License will expire upon the expiration of the last-to-expire valid claim of all of the patents licensed to or from each of the parties to the agreement. Either party may terminate any of the licenses granted under the agreement (1) in the event of the other party's material breach, subject to an opportunity to cure within the time period specified in the Cellectis License, or (2) if the other party directly or indirectly challenges a patent licensed to it by the other party.

Competition

As a diversified life sciences company, we compete in multiple different fields. The biotechnology, pharmaceutical and agricultural biotechnology industries are characterized by rapidly advancing technologies, intense competition and a strong emphasis on intellectual property and proprietary products. We principally compete with others developing and utilizing genome editing technology in the human health and plant sciences sectors, including companies such as Cellectis S.A., CRISPR Therapeutics, AG, Editas Medicine, Inc., Intellia Therapeutics, Inc. and Sangamo Therapeutics, Inc.

We compete with many biotechnology and pharmaceutical companies, academic research institutions, governmental agencies and public and private research institutions. We expect that our operations focused on CAR T cell product development and commercialization will face substantial competition from those focusing on immunotherapy solutions. Several companies, including Novartis Pharmaceuticals Corp. and Gilead Sciences, Inc., have obtained FDA approval for autologous cell therapies, and a number of companies, including Cellectis S.A., Celgene Corp., Allogene Therapeutics and CRISPR Therapeutics AG, are pursuing allogeneic cell therapies. We expect that our operations focused on developing products for *in vivo* treatment of genetic disease will face

substantial competition from others focusing on gene therapy treatments, especially those that may focus on conditions that our product candidates target. Moreover, any human therapeutics products that we may develop will compete with existing standards of care for the diseases and conditions that our product candidates target and other types of treatments, such as small molecule, antibody or protein therapies.

Many of our current or potential competitors in the therapeutics space, either alone or with their collaboration partners, have significantly greater financial resources and expertise in research and development, manufacturing, preclinical testing, conducting clinical trials and marketing approved products than we do. In addition to competing on the bases of safety, efficacy, timing of development and commercialization, convenience, cost, availability of reimbursement and rate of adoption of potential product candidates, we may also compete with these competitors in recruiting and retaining qualified personnel, establishing clinical sites, establishing relationships with collaborators or other third parties, registering patients for clinical trials and acquiring technologies complementary to, or necessary for, our product development platforms. Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize products that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than any products that we may develop. Our competitors also may obtain FDA or other regulatory approval for their products more rapidly than we may obtain approval for ours, which could result in our competitors establishing a strong market position before we are able to enter the market.

We also compete with participants in the agricultural biotechnology space, including Pairwise Plants, LLC, Caribou Biosciences, Inc., Corteva Agriscience, Tropic Biosciences UK LTD, Calyxt, Inc. and Cibus. Competition for improving plant genetics comes from conventional and advanced plant breeding techniques, as well as from the development of genetically modified traits. Competition for providing more nutritious ingredients for food companies comes from chemical-based ingredients, additives and substitutes, which are developed by various companies. We also face less direct competition from trait research and development companies and agricultural research universities and institutions. We compete with respect to many aspects of the product development cycle in the plant sciences space, such as computational capabilities for identifying relevant gene targets, access to germplasm and enabling technologies and entry into strategic relationships to facilitate product development and commercialization.

Many of our current or potential competitors in the agricultural biotechnology space, either alone or with others, have significantly greater financial resources and expertise in research and development, manufacturing, testing and marketing approved products than we do. Mergers and acquisitions in the plant science, specialty food ingredient and agricultural biotechnology, seed and chemical industries may result in even more resources being concentrated among a smaller number of our competitors. Smaller or early-stage companies may also prove to be significant competitors, particularly through strategic relationships with large and established companies. These competitors also compete with us in recruiting and retaining qualified scientific and management personnel, as well as in acquiring technologies complementary to, or necessary for, our food platform.

Furthermore, we rely upon a combination of patents and trade secret protection, as well as license and confidentiality agreements to protect the intellectual property related to our proprietary technologies, product candidate development programs and product candidates. Our success depends in large part on our ability to secure and maintain patent protection in the United States and other countries with respect to the ARCUS nucleases used in our existing allogeneic CAR T immunotherapy, *in vivo* gene correction and food programs, as well as any future product candidates. Moreover, the industries in which we operate are characterized by the existence of large numbers of patents and frequent allegations of patent infringement. If, therefore, we are unable to obtain and maintain patent protection for our technology and product candidates, or if the scope of the patent protection obtained or in-licensed is not sufficiently broad or if the validity of such patent is threatened, we may not be able to compete effectively, as it could create opportunities for competitors to enter

the market or dissuade other companies from collaborating with us to develop products and technology, any of which would hurt our competitive position and could impair our ability to successfully commercialize our product candidates in any indication for which they are approved.

Intellectual property

Our success depends in part on our abilities to (1) obtain and maintain proprietary protection for ARCUS, (2) defend and enforce our intellectual property rights, in particular, our patent rights, (3) preserve the confidentiality of our know-how and trade secrets, and (4) operate without infringing valid and enforceable intellectual property rights of others. We seek to protect our proprietary position by, among other things, exclusively licensing U.S. and certain foreign patent applications, and filing U.S. and certain foreign patent applications, related to ARCUS, existing and planned programs, and improvements that are important to the development of our business, where patent protection is available. We also rely on trademarks, trade secrets, know-how, continuing technological innovation and confidential information, and the pursuit of licensing opportunities, to develop and maintain our proprietary position and protect aspects of our business that are not amenable to, or that we do not consider appropriate for, patent protection. We seek to protect our proprietary technology and processes, in part, by confidentiality agreements and invention assignment agreements with our employees, consultants, scientific advisors, contractors and others who may have access to proprietary information, under which they are bound to assign to us inventions made during the term of their employment or term of service. We also seek to preserve the integrity and confidentiality of our data and trade secrets by maintaining physical security of our premises and physical and electronic security of our information technology systems.

We cannot be sure that patents will be granted with respect to any patent applications we have licensed or filed or may license or file in the future, and we cannot be sure that any patents we have licensed or which have been granted to us, or patents that may be licensed or granted to us in the future, will not be challenged, invalidated or circumvented or that such patents will be commercially useful in protecting our technology. Moreover, trade secrets can be difficult to protect. While we have confidence in the measures we take to protect and preserve our trade secrets, such measures can be breached, and we may not have adequate remedies for any such breach. In addition, our trade secrets may otherwise become known or be independently discovered by competitors. For more information regarding the risks related to our intellectual property, see “Risk factors—Risks related to intellectual property.”

Our patent portfolio consists of a combination of issued patents and pending patent applications that are owned by us or licensed by us from third parties. As of December 31, 2018, we have an exclusive license from Duke University under 12 issued U.S. patents and two pending U.S. patent applications. In addition, as of December 31, 2018, we own 16 issued U.S. patents, 12 pending non-provisional U.S. patent applications, and eight pending PCT international patent applications. We also exclusively license from Duke or own many corresponding patents and patent applications outside the United States, as described below. We intend to pursue, when possible, additional patent protection, including composition of matter, method of use and process claims, related to ARCUS. We also intend to obtain rights to existing delivery technologies through one or more licenses from third parties.

ARCUS platform patent families

We license one patent family from Duke and own two patent families that are directed to the core technologies employed in our ARCUS platform for nuclease design. Thus, each of our product candidates is protected by one or more patents in these families.

The first family, licensed from Duke, includes 12 issued U.S. patents, eight issued European patents, three issued Japanese patents, and one issued patent in each of Australia and Canada. This family also includes one pending patent application in each of the United States, Europe, Japan and Canada. Patents in this family include claims directed to (1) recombinant meganucleases having altered cleavage specificity, altered heterodimer formation, and/or altered DNA binding affinity, (2) methods for cleaving target recognition sites in DNA using such meganucleases, and (3) methods for producing genetically modified eukaryotic cells using such meganucleases. Patents in this family have a standard expiration date of October 18, 2026, subject to potential extensions.

The second family, which we own, includes four issued U.S. patents, two issued patents in each of Europe and Japan, and one issued Australian patent. This family also includes one pending patent application in each of the United States, Europe, Japan and Australia. Patents in this family include claims directed to (1) recombinant single-chain meganucleases, and (2) methods for producing isolated genetically modified eukaryotic cells using such meganucleases. Patents in this family have a standard expiration date of October 31, 2028, subject to potential extensions.

The third family, which we own, includes one issued patent in the United States, and two issued patents in each of Europe and Australia. This family also includes two pending patent applications in the United States and one pending patent application in Europe. Patents in this family include claims directed to methods of cleaving DNA at specific four base pair sites using a recombinant meganuclease. Patents in this family have a standard expiration date of July 14, 2029, subject to potential extensions.

Immunotherapy patent families

We own nine patent families that are directed to immunotherapy, including CAR T cell therapies. Some of these are applicable to immunotherapies and/or CAR T cells directed to killing a variety of different types of infected or cancerous cells. Others are directed to specific indications in which cells expressing particular antigens are targeted. Each of our immunotherapy product candidates is protected by one or more patents in these families.

The first family includes nine issued U.S. patents, and pending patent applications in each of the United States, Europe, Australia, Canada, China, Israel, Japan, Mexico and South Korea. Patents in this family include claims directed to (1) populations of genetically modified human T cells in which 20%-65% of the cells have reduced expression of an endogenous TCR and express an anti-cancer antigen CAR from DNA inserted into the cells' TCR alpha constant region (TRAC) gene, (2) methods for using such populations of genetically modified human T cells for cancer immunotherapy, (3) pharmaceutical compositions comprising such populations of genetically modified human T cells, (4) genetically modified human T cells which have reduced expression of an endogenous TCR and express an anti-cancer antigen CAR from DNA inserted into the cells' TRAC gene, (5) methods for using such genetically modified human T cells for cancer immunotherapy, and (6) pharmaceutical compositions comprising such genetically modified human T cells. Patents in this family have a standard expiration date of October 5, 2036, subject to potential extensions.

The second family includes pending patent applications in each of the United States, Europe, Australia, Canada and Japan. Patent applications in this family include claims directed to (1) first-generation recombinant meganucleases that cleave a target in the TRAC gene, (2) nucleic acids and vectors encoding such recombinant meganucleases, (3) methods for producing genetically modified eukaryotic cells, including CAR T cells, using such meganucleases, and (4) methods of using such genetically modified eukaryotic cells for cancer immunotherapy. Patents in this family, if issued, will have a standard expiration date of October 5, 2036, subject to potential extensions.

The third family includes a pending provisional patent application in the United States. That provisional patent application includes claims directed to (1) second-generation engineered meganucleases that cleave a specific

target in the TRAC gene, (2) nucleic acids and vectors encoding such recombinant meganucleases, (3) methods for producing genetically modified eukaryotic cells, including CAR T cells, using such meganucleases, (4) genetically modified eukaryotic cells or populations of cells prepared by such methods, (5) pharmaceutical compositions comprising such cells or populations of cells, and (6) methods of treating diseases using such cells, populations of cells or pharmaceutical compositions to treat diseases, including cancer immunotherapy. Patents in this family, if issued, will likely have a standard expiration date of April 12, 2039, subject to potential extensions.

The fourth family includes a pending PCT international patent application. That PCT patent application includes claims directed to (1) nucleic acids encoding co-stimulatory domains having certain amino acid sequences, (2) recombinant DNA constructs and vectors comprising such nucleic acids, (3) nucleic acids and vectors encoding such recombinant meganucleases, (4) genetically modified cells comprising such nucleic acids, (5) methods for producing such genetically modified cells, (6) pharmaceutical compositions comprising such cells, and (7) methods of immunotherapy using such cells. Patents in this family, if issued, will have a standard expiration date of October 4, 2037, subject to potential extensions.

The fifth family includes a pending PCT international patent application. That PCT patent application includes claims directed to (1) methods of reducing cytotoxicity associated with DNA transfection in primary eukaryotic cells, (2) methods for increasing the number of gene-edited primary eukaryotic cells following DNA transfection, (3) methods for increasing gene editing frequency in primary eukaryotic cells following DNA transfection, (4) methods for increasing the number of primary eukaryotic cells comprising targeted insertion of an exogenous sequence of interest into the genome following DNA transfection, (5) methods for increasing insertion frequency of an exogenous sequence of interest into the genome in primary eukaryotic cells following DNA transfection, (6) methods for high throughput screening of primary human T cells expressing a CAR or exogenous TCR, (7) methods for high throughput screening of primary human T cells expressing a CAR or exogenous TCR, and (8) genetically modified primary eukaryotic cells produced by such methods. Patents in this family, if issued, will have a standard expiration date of April 30, 2038, subject to potential extensions.

The sixth family includes pending patent applications in the United States, Europe, Australia, Canada and Japan. Patent applications in this family include claims directed to (1) recombinant meganucleases that recognize and cleave a recognition sequence within the human beta-2-microglobulin gene, (2) nucleic acids and vectors encoding such recombinant meganucleases, (3) methods for producing genetically modified eukaryotic cells, including CAR T cells, using such meganucleases, (4) populations of genetically modified eukaryotic cells in which 80% of the cells have reduced expression of an endogenous TCR and 80% of the cells have reduced expression of beta-2-microglobulin, (5) pharmaceutical compositions comprising such populations of genetically modified eukaryotic cells, and (6) methods for using such genetically modified eukaryotic cells for cancer immunotherapy. Patents in this family, if issued, will have a standard expiration date of December 22, 2036, subject to potential extensions.

The seventh family includes a pending PCT international patent application. That PCT patent application includes claims directed to (1) nucleic acids encoding an engineered antigen receptor (e.g., a CAR) and an inhibitory molecule (e.g., an RNA interfering with beta-2-microglobulin expression), (2) genetically modified eukaryotic cells comprising such nucleic acids, (3) methods for producing such genetically modified eukaryotic cells using such nucleic acids and an engineered nuclease that promotes insertion of such nucleic acids, (4) genetically modified eukaryotic cells expressing an engineered antigen receptor and having expression of beta-2-microglobulin or MHC Class I molecules reduced by 10%-95%, (5) pharmaceutical compositions comprising such genetically modified eukaryotic cells, and (6) methods for using such genetically modified eukaryotic cells for immunotherapy. Patents in this family, if issued, will have a standard expiration date of May 8, 2038, subject to potential extensions.

The eighth family includes a pending PCT international patent application. That PCT patent application includes claims directed to (1) engineered meganucleases that recognize and cleave a recognition sequence in an upstream intron of the human TRAC gene, (2) nucleic acids and vectors encoding such engineered meganucleases, (3) methods for producing genetically modified T cells using such nucleic acids or vectors, (4) genetically modified T cells in which an exogenous sequence is inserted into an upstream intron of the human TRAC gene and endogenous TCR expression is reduced, (5) populations of such genetically modified T cells, (6) pharmaceutical compositions comprising such genetically modified T cells, and (7) methods of treating disease using such genetically modified T cells and pharmaceutical compositions, including cancer immunotherapy. Patents in this family, if issued, will have a standard expiration date of June 27, 2038, subject to potential extensions.

The ninth family includes a pending PCT international patent application. That PCT patent application includes claims directed to (1) nucleic acids and vectors encoding certain modified human epidermal growth factor receptor, or EGFRs, (2) genetically modified cells and populations of cells, including T cells and CAR T cells, expressing such modified EGFRs, (3) methods for producing such genetically modified cells using such nucleic acids or vectors encoding such modified EGFRs, (4) pharmaceutical compositions comprising such genetically modified cells, (5) methods for isolating such genetically modified cells, (6) methods of treating disease using such genetically modified cells and pharmaceutical compositions, including cancer immunotherapy, and (7) methods of depleting such genetically modified cells in a subject using anti-modified EGFR antibodies. Patents in this family, if issued, will likely have a standard expiration date of October 3, 2038, subject to potential extensions.

Hepatitis B virus gene therapy patent families

We own two patent families that are directed to gene therapy for Hepatitis B Virus.

The first family includes a pending PCT international patent application. That PCT patent application includes claims directed to (1) engineered meganucleases that recognize and cleave recognition sites in the Hepatitis B virus (HBV) genome, (2) nucleic acids and vectors encoding such engineered meganucleases, (3) pharmaceutical compositions comprising such nucleic acids or meganucleases, and (4) methods for treating HBV infection using such meganucleases, nucleic acids and/or pharmaceutical compositions. Patents in this family, if issued, will have a standard expiration date of October 13, 2037, subject to potential extensions.

The second family includes a pending U.S. provisional patent application. That provisional patent application includes claims directed to (1) second-generation engineered meganucleases that recognize and cleave recognition sites in the Hepatitis B virus, or HBV genome, (2) nucleic acids and vectors encoding such engineered meganucleases, (3) pharmaceutical compositions comprising such nucleic acids or meganucleases, and (4) methods for treating HBV infection using such meganucleases, nucleic acids and/or pharmaceutical compositions. Patents in this family, if issued, will likely have a standard expiration date of April 12, 2039, subject to potential extensions.

Hemophilia A gene therapy patent families

We own two patent families that are directed to gene therapy for Hemophilia A.

The first family includes pending patent applications in the United States, Europe, Australia, Canada, and Japan. Patent applications in this family include claims directed to (1) engineered meganucleases that recognize and cleave recognition sites in a mutant Factor VIII gene, (2) nucleic acids and vectors encoding such engineered meganucleases, (3) pharmaceutical compositions comprising such nucleic acids or meganucleases, and (4) methods for treating Hemophilia A using such meganucleases, nucleic acids and/or pharmaceutical

compositions. Patents in this family, if issued, will have a standard expiration date of May 3, 2037, subject to potential extensions.

The second family includes a pending PCT international patent application. That PCT patent application includes claims directed to (1) engineered meganucleases that recognize and cleave non-methylated recognition sites in a mutant Factor VIII gene, (2) nucleic acids and vectors encoding such engineered meganucleases, (3) pharmaceutical compositions comprising such nucleic acids or meganucleases, and (4) methods for treating Hemophilia A using such meganucleases, nucleic acids and/or pharmaceutical compositions. Patents in this family, if issued, will likely have a standard expiration date of November 1, 2038, subject to potential extensions.

Other patent families

We own a pending PCT international patent application directed to engineered meganucleases and methods of treatment targeting the PCSK9 gene, which is associated with familial hypercholesterolemia. Patents in this family, if issued, will have a standard expiration date of April 20, 2038, subject to potential extensions.

We own pending patent applications in the United States, Europe, Australia, Canada and Japan directed to engineered meganucleases and methods of treatment targeting the rhodopsin gene, which is associated with retinitis pigmentosa. Patents in this family, if issued, will have a standard expiration date of September 8, 2036, subject to potential extensions.

We own pending patent applications in the United States, Europe, Australia, Canada and Japan directed to engineered meganucleases and methods of treatment targeting the dystrophin gene, which is associated with Duchenne Muscular Dystrophy. Patents in this family, if issued, will have a standard expiration date of March 12, 2035, subject to potential extensions.

We own pending patent applications in the United States and Europe directed to engineered meganucleases and methods of treatment targeting genomic trinucleotide repeats, which are associated with several trinucleotide repeat disorders. Patents in this family, if issued, will have a standard expiration date of May 2, 2036, subject to potential extensions.

We own a pending United States provisional patent application directed to the genetic modification of the hydroxyacid oxidase 1 gene for the treatment of primary hyperoxaluria. Patents in this family, if issued, will likely have a standard expiration date of December 21, 2039, subject to potential extensions.

We license from Duke a pending patent application in the United States directed to engineered fusion proteins comprising engineered meganuclease domains and effector domains which may be useful in controlling gene expression. Patents in this family, if issued, will have a standard expiration date of October 18, 2026, subject to potential extensions.

We own one patent and one pending patent application in each of the United States and Europe, directed to engineered meganucleases that target amplifiable genetic loci and may be useful in producing cells with amplified transgenes. Patents in this family will have a standard expiration date of June 1, 2032, subject to potential extensions.

We own pending patent applications in the United States and Europe directed to self-limiting viral vectors (e.g., AAV vectors) that encode engineered meganucleases which eliminate the vector after gene delivery. Patents in this family, if issued, will have a standard expiration date of June 20, 2036, subject to potential extensions.

We own, through our Elo Life Systems subsidiary, an issued U.S. patent directed to engineered meganucleases which target a genetic locus in maize and methods for genetically modifying that locus in maize. That patent has a standard expiration date of March 2, 2029, subject to potential extensions.

For any individual patent, the term depends on the applicable law in the country in which the patent is granted. In most countries where we have filed patent applications or in-licensed patents and patent applications, patents have a term of 20 years from the application filing date or earliest claimed non-provisional priority date. In the United States, the patent term is 20 years but may be shortened if a patent is terminally disclaimed over another patent that expires earlier. The term of a U.S. patent may also be lengthened by a patent term adjustment to address administrative delays by the USPTO in granting a patent.

In the United States, the term of a patent that covers an FDA-approved drug or biologic may be eligible for patent term extension in order to restore the period of a patent term lost during the premarket FDA regulatory review process. The Hatch-Waxman Act permits a patent term extension of up to five years beyond the natural expiration of the patent. The patent term restoration period is generally equal to the portion of the FDA regulatory review period for the approved product that occurs after the date the patent issued, subject to certain exceptions. Only one patent may be extended for a regulatory review period for any product, and the application for the extension must be submitted prior to the expiration of the patent. In the future, we may decide to apply for restoration of patent term for one of our currently owned or licensed patents to extend its current expiration date, depending on the expected length of the clinical studies and other factors involved in the filing of the relevant BLA.

We or our licensors may be subject to claims that former employees, collaborators or other third parties have an interest in our owned or in-licensed patents or other intellectual property as an inventor or co-inventor. If we are required to and unable to obtain an exclusive license to any such third party co-owners' interest in such patent applications, such co-owners may be able to license their rights to other third parties, including our competitors. In addition, we may need the cooperation of any such co-owners to enforce any patents that issue from such patent applications against third parties, and such cooperation may not be provided to us. We or our licensors are subject to and may also become a party to similar proceedings or priority disputes in Europe or other foreign jurisdictions.

Our registered trademark portfolio currently contains two registered trademarks, specifically ARC nuclease and ARCUS, in the United States. In addition, there are two pending applications in the United States for the marks Elo Life Systems and Precision Breeding Technologies. Finally, our international portfolio contains seven registered trademarks around the world for ARC nuclease and ARCUS.

Licensed intellectual property

Duke University

In April 2006, we exclusively licensed from Duke families of patents and patent applications related to certain meganucleases and methods of making such nucleases owned by Duke. The patent family covered by the Duke License comprises the core patents covering ARCUS described above. See "—License and collaboration agreements—Duke University" above for additional information regarding the Duke License.

Cellectis S.A.

In January 2014, we entered into the Cellectis License, which relates to certain modified I-CreI homing endonuclease patents and patents that had been subject to litigation between us and Cellectis. The patents to which we have rights under the cross-license include at least eight issued patents in each of the United States and Australia, seven issued patents in Europe, two issued patents in Canada and one issued patent in Japan. These patents have standard expiration dates prior to January 29, 2034, subject to potential extensions. See "—License and collaboration agreements—Cellectis S.A." above for additional information regarding the Cellectis License.

Government regulation

The FDA and other regulatory authorities at federal, state, and local levels, as well as in foreign countries, extensively regulate, among other things, the research, development, testing, manufacture, quality control, import, export, safety, effectiveness, labeling, packaging, storage, distribution, record keeping, approval, advertising, promotion, marketing, post-approval monitoring, and post-approval reporting of biological product candidates such as those we are developing. We, along with third-party contractors, will be required to navigate the various preclinical, clinical and commercial approval requirements of the governing regulatory agencies of the countries in which we wish to conduct studies or seek approval or licensure of our product candidates. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local and foreign statutes and regulations require the expenditure of substantial time and financial resources.

U.S. biologics regulation

The process required by the FDA before biologic product candidates may be marketed in the United States generally involves the following:

- completion of preclinical laboratory tests and animal studies performed in accordance with the FDA's Good Laboratory Practice requirements, or GLPs;
- submission to the FDA of an Investigational New Drug application, or IND, which must become effective before clinical trials may begin;
- approval by an IRB or ethics committee at each clinical site before the trial is commenced;
- performance of adequate and well-controlled human clinical trials to establish the safety, purity and potency of the proposed biologic product candidate for its intended purpose;
- preparation of and submission to the FDA of a BLA after completion of all pivotal clinical trials;
- satisfactory completion of an FDA Advisory Committee review, if applicable;
- a determination by the FDA within 60 days of its receipt of a BLA to file the application for review;
- satisfactory completion of an FDA pre-approval inspection of the manufacturing facility or facilities at which the proposed product is produced to assess compliance with cGMP and to assure that the facilities, methods and controls are adequate to preserve the biological product's continued safety, purity and potency, and of selected clinical investigation sites to assess compliance with GCPs; and
- FDA review and approval of the BLA to permit commercial marketing of the product for particular indications for use in the United States.

Prior to beginning the first clinical trial with a product candidate in the United States, we must submit an IND to the FDA. An IND is a request for authorization from the FDA to administer an investigational new drug product to humans. The central focus of an IND submission is on the general investigational plan and the protocol(s) for clinical studies. The IND also includes results of animal and *in vitro* studies assessing the toxicology, pharmacokinetics, pharmacology, and pharmacodynamic characteristics of the product; chemistry, manufacturing, and controls information; and any available human data or literature to support the use of the investigational product. An IND must become effective before human clinical trials may begin. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA, within the 30-day time period, raises safety concerns or questions about the proposed clinical trial. In such a case, the IND may be placed on clinical hold and the IND sponsor and the FDA must resolve any outstanding concerns or questions before the clinical trial can begin. Submission of an IND therefore may or may not result in FDA authorization to begin a clinical trial.

In addition to the submission of an IND to the FDA before initiation of a clinical trial in the United States, certain human clinical trials involving recombinant or synthetic nucleic acid molecules had historically been subject to review by the Recombinant DNA Advisory Committee, or the RAC, of the NIH Office of Biotechnology Activities, or the OBA, pursuant to the NIH Guideline. On August 17, 2018, the NIH issued a notice in the Federal Register and issued a public statement proposing changes to the oversight framework for gene therapy trials, including changes to the applicable NIH Guidelines to modify the roles and responsibilities of the RAC with respect to human clinical trials of gene therapy products, and requesting public comment on its proposed modifications. During the public comment period, which closes October 16, 2018, the NIH has announced that it will no longer accept new human gene transfer protocols for review as a part of the protocol registration process or convene the RAC to review individual clinical protocols. These trials will remain subject to the FDA's oversight and other clinical trial regulations, and oversight at the local level will continue as set forth in the NIH Guidelines. Specifically, under the NIH Guidelines, supervision of human gene transfer trials includes evaluation and assessment by an IBC, a local institutional committee that reviews and oversees research utilizing recombinant or synthetic nucleic acid molecules at that institution. The IBC assesses the safety of the research and identifies any potential risk to public health or the environment, and such review may result in some delay before initiation of a clinical trial. While the NIH Guidelines are not mandatory unless the research in question is being conducted at or sponsored by institutions receiving NIH funding of recombinant or synthetic nucleic acid molecule research, many companies and other institutions not otherwise subject to the NIH Guidelines voluntarily follow them.

Clinical trials involve the administration of the investigational product to human subjects under the supervision of qualified investigators in accordance with GCPs, which include the requirement that all research subjects provide their informed consent for their participation in any clinical study. Clinical trials are conducted under protocols detailing, among other things, the objectives of the study, the parameters to be used in monitoring safety and the effectiveness criteria to be evaluated. A separate submission to the existing IND must be made for each successive clinical trial conducted during product development and for any subsequent protocol amendments. Furthermore, an independent IRB for each site proposing to conduct the clinical trial must review and approve the plan for any clinical trial and its informed consent form before the clinical trial begins at that site, and must monitor the study until completed. Regulatory authorities, the IRB or the sponsor may suspend a clinical trial at any time on various grounds, including a finding that the subjects are being exposed to an unacceptable health risk or that the trial is unlikely to meet its stated objectives. Some studies also include oversight by an independent group of qualified experts organized by the clinical study sponsor, known as a data safety monitoring board, which provides authorization for whether or not a study may move forward at designated check points based on access to certain data from the study and may halt the clinical trial if it determines that there is an unacceptable safety risk for subjects or other grounds, such as no demonstration of efficacy. There are also requirements governing the reporting of ongoing clinical studies and clinical study results to public registries.

For purposes of BLA approval, human clinical trials are typically conducted in three sequential phases that may overlap or be combined:

- Phase 1—The investigational product is initially introduced into healthy human subjects or patients with the target disease or condition. These studies are designed to test the safety, dosage tolerance, absorption, metabolism and distribution of the investigational product in humans, the side effects associated with increasing doses, and, if possible, to gain early evidence on effectiveness.
- Phase 2—The investigational product is administered to a limited patient population with a specified disease or condition to evaluate the preliminary efficacy, optimal dosages and dosing schedule and to identify possible adverse side effects and safety risks. Multiple Phase 2 clinical trials may be conducted to obtain information prior to beginning larger and more expensive Phase 3 clinical trials.

- Phase 3—The investigational product is administered to an expanded patient population to further evaluate dosage, to provide statistically significant evidence of clinical efficacy and to further test for safety, generally at multiple geographically dispersed clinical trial sites. These clinical trials are intended to establish the overall risk/benefit ratio of the investigational product and to provide an adequate basis for product approval.
- Phase 4—In some cases, the FDA may require, or companies may voluntarily pursue, additional clinical trials after a product is approved to gain more information about the product. These so-called Phase 4 studies may be made a condition to approval of the BLA.

Concurrent with clinical trials, companies may complete additional animal studies and develop additional information about the biological characteristics of the product candidate, and must finalize a process for manufacturing the product in commercial quantities in accordance with cGMP. The manufacturing process must be capable of consistently producing quality batches of the product candidate and, among other things, must develop methods for testing the identity, strength, quality and purity of the final product, or for biologics, the safety, purity and potency. Additionally, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the product candidate does not undergo unacceptable deterioration over its shelf life.

BLA submission and review by the FDA

Assuming successful completion of all required testing in accordance with all applicable regulatory requirements, the results of product development, nonclinical studies and clinical trials are submitted to the FDA as part of a BLA requesting approval to market the product for one or more indications. The BLA must include all relevant data available from pertinent preclinical and clinical studies, including negative or ambiguous results as well as positive findings, together with detailed information relating to the product's chemistry, manufacturing, controls, and proposed labeling, among other things. Data can come from company-sponsored clinical studies intended to test the safety and effectiveness of a use of the product, or from a number of alternative sources, including studies initiated by investigators. The submission of a BLA requires payment of a substantial user fee to FDA, and the sponsor of an approved BLA is also subject to an annual program fee. These fees are typically increased annually. A waiver of user fees may be obtained under certain limited circumstances. Additionally, no user fees are assessed on BLAs for products designated as orphan drugs, unless the product also includes a non-orphan indication.

Once a BLA has been submitted, the FDA's goal is to review standard applications within ten months after it accepts the application for filing, or, if the application qualifies for priority review, six months after the FDA accepts the application for filing. Priority review designation will direct overall attention and resources to the evaluation of applications for products that, if approved, would be significant improvements in the safety or effectiveness of the treatment, diagnosis, or prevention of serious conditions. In both standard and priority reviews, the review process is often significantly extended by FDA requests for additional information or clarification. The FDA reviews a BLA to determine, among other things, whether a product is safe, pure and potent and the facility in which it is manufactured, processed, packed, or held meets standards designed to assure the product's continued safety, purity and potency. The FDA may convene an advisory committee to provide clinical insight on application review questions. Before approving a BLA, the FDA will typically inspect the facility or facilities where the product is manufactured. The FDA will not approve an application unless it determines that the manufacturing processes and facilities are in compliance with cGMP and adequate to assure consistent production of the product within required specifications. Additionally, before approving a BLA, the FDA will typically inspect one or more clinical sites to assure compliance with GCP. If the FDA determines that the application, manufacturing process or manufacturing facilities are not acceptable, it will

outline the deficiencies in the submission and often will request additional testing or information. Notwithstanding the submission of any requested additional information, the FDA ultimately may decide that the application does not satisfy the regulatory criteria for approval.

After the FDA evaluates a BLA and conducts inspections of manufacturing facilities where the investigational product and/or its drug substance will be produced, the FDA may issue an approval letter or a Complete Response Letter. An approval letter authorizes commercial marketing of the product with specific prescribing information for specific indications. A Complete Response Letter will describe all of the deficiencies that the FDA has identified in the BLA, except that where the FDA determines that the data supporting the application are inadequate to support approval, the FDA may issue the Complete Response Letter without first conducting required inspections, testing submitted product lots, and/or reviewing proposed labeling. In issuing the Complete Response Letter, the FDA may recommend actions that the applicant might take to place the BLA in condition for approval, including requests for additional information or clarification. The FDA may delay or refuse approval of a BLA if applicable regulatory criteria are not satisfied, require additional testing or information and/or require post-marketing testing and surveillance to monitor safety or efficacy of a product.

If regulatory approval of a product is granted, such approval will be granted for particular indications and may entail limitations on the indicated uses for which such product may be marketed. For example, the FDA may approve the BLA with a REMS to ensure the benefits of the product outweigh its risks. A REMS is a safety strategy to manage a known or potential serious risk associated with a medicine and to enable patients to have continued access to such medicines by managing their safe use, and could include medication guides, physician communication plans, or elements to assure safe use, such as restricted distribution methods, patient registries, and other risk minimization tools. The FDA also may condition approval on, among other things, changes to proposed labeling or the development of adequate controls and specifications. Once approved, the FDA may withdraw the product approval if compliance with pre- and post-marketing requirements is not maintained or if problems occur after the product reaches the marketplace. The FDA may require one or more Phase IV post-market studies and surveillance to further assess and monitor the product's safety and effectiveness after commercialization, and may limit further marketing of the product based on the results of these post-marketing studies. In addition, new government requirements, including those resulting from new legislation, may be established, or the FDA's policies may change, which could impact the timeline for regulatory approval or otherwise impact ongoing development programs. For example, in December 2016, the 21st Century Cures Act was signed into law. The Act is intended, among other things, to modernize the regulation of drugs and biologics and to spur innovation.

Expedited development and review programs

A sponsor may seek approval of its product candidate under programs designed to accelerate FDA's review and approval of new drugs and biological products that meet certain criteria. Specifically, new drugs and biological products are eligible for fast track designation if they are intended to treat a serious or life-threatening disease or condition and demonstrate the potential to address unmet medical needs for the disease or condition. For a fast track product, the FDA may consider sections of the BLA for review on a rolling basis before the complete application is submitted, if the sponsor provides a schedule for the submission of the sections of the application, the FDA agrees to accept sections of the application and determines that the schedule is acceptable and the sponsor pays any required user fees upon submission of the first section of the application. A fast track designated product candidate may also qualify for priority review, under which the FDA sets the target date for FDA action on the BLA at six months after the FDA accepts the application for filing. Priority review is granted when there is evidence that the proposed product would be a significant improvement in the safety or effectiveness of the treatment, diagnosis, or prevention of a serious disease or condition. If criteria are not met for priority review, the application is subject to the standard FDA review period of 10 months after FDA accepts

the application for filing. Priority review designation does not change the scientific/medical standard for approval or the quality of evidence necessary to support approval.

Under the accelerated approval program, the FDA may approve a BLA on the basis of either a surrogate endpoint that is reasonably likely to predict clinical benefit, or on a clinical endpoint that can be measured earlier than irreversible morbidity or mortality, that is reasonably likely to predict an effect on irreversible morbidity or mortality or other clinical benefit, taking into account the severity, rarity, or prevalence of the condition and the availability or lack of alternative treatments. Post-marketing studies or completion of ongoing studies after marketing approval are generally required to verify the biologic's clinical benefit in relationship to the surrogate endpoint or ultimate outcome in relationship to the clinical benefit. In addition, the FDA currently requires as a condition for accelerated approval pre-approval of promotional materials, which could adversely impact the timing of the commercial launch of the product. FDA may withdraw approval of a drug or indication approved under accelerated approval if, for example, the confirmatory trial fails to verify the predicted clinical benefit of the product.

In addition, the Food and Drug Administration Safety and Innovation Act, or the FDASIA, which was enacted and signed into law in 2012, established the breakthrough therapy designation. A sponsor may seek FDA designation of its product candidate as a breakthrough therapy if the product candidate is intended, alone or in combination with one or more other drugs or biologics, to treat a serious or life-threatening disease or condition and preliminary clinical evidence indicates that the therapy may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. If the FDA designates a breakthrough therapy, it may take actions appropriate to expedite the development and review of the application, which may include holding meetings with the sponsor and the review team throughout the development of the therapy; providing timely advice to, and interactive communication with, the sponsor regarding the development of the drug to ensure that the development program to gather the nonclinical and clinical data necessary for approval is as efficient as practicable; involving senior managers and experienced review staff, as appropriate, in a collaborative, cross-disciplinary review; assigning a cross-disciplinary project lead for the FDA review team to facilitate an efficient review of the development program and to serve as a scientific liaison between the review team and the sponsor; and considering alternative clinical trial designs when scientifically appropriate, which may result in smaller trials or more efficient trials that require less time to complete and may minimize the number of patients exposed to a potentially less efficacious treatment. Breakthrough therapy designation comes with all of the benefits of fast track designation, which means that the sponsor may file sections of the BLA for review on a rolling basis if certain conditions are satisfied, including an agreement with the FDA on the proposed schedule for submission of portions of the application and the payment of applicable user fees before the FDA may initiate a review.

Fast Track designation, priority review and breakthrough therapy designation do not change the standards for approval but may expedite the development or approval process. Even if a product qualifies for one or more of these programs, the FDA may later decide that the product no longer meets the conditions for qualification or decide that the time period for FDA review or approval will not be shortened.

Orphan drug designation and exclusivity

Under the Orphan Drug Act, the FDA may grant orphan designation to a drug or biologic intended to treat a rare disease or condition, defined as a disease or condition with a patient population of fewer than 200,000 individuals in the United States, or a patient population greater than 200,000 individuals in the United States and when there is no reasonable expectation that the cost of developing and making available the drug or biologic in the United States will be recovered from sales in the United States for that drug or biologic. Orphan

drug designation must be requested before submitting a BLA. After the FDA grants orphan drug designation, the generic identity of the therapeutic agent and its potential orphan use are disclosed publicly by the FDA.
If a product that has orphan drug designation subsequently receives the first FDA approval for a particular active ingredient for the disease for which it has such designation, the product is entitled to orphan product exclusivity, which means that the FDA may not approve any other applications, including a full BLA, to market the same biologic for the same indication for seven years, except in limited circumstances, such as a showing of clinical superiority to the product with orphan drug exclusivity or if the FDA finds that the holder of the orphan drug exclusivity has not shown that it can assure the availability of sufficient quantities of the orphan drug to meet the needs of patients with the disease or condition for which the drug was designated. Orphan drug exclusivity does not prevent the FDA from approving a different drug or biologic for the same disease or condition, or the same drug or biologic for a different disease or condition. Among the other benefits of orphan drug designation are tax credits for certain research and a waiver of the BLA application user fee.

A designated orphan drug many not receive orphan drug exclusivity if it is approved for a use that is broader than the indication for which it received orphan designation. In addition, orphan drug exclusive marketing rights in the United States may be lost if the FDA later determines that the request for designation was materially defective or, as noted above, if the second applicant demonstrates that its product is clinically superior to the approved product with orphan exclusivity or the manufacturer of the approved product is unable to assure sufficient quantities of the product to meet the needs of patients with the rare disease or condition. We plan to seek orphan drug designation for some or all of our product candidates in specific orphan indications in which there is a medically plausible basis for the use of these products.

Post-approval requirements

Any products manufactured or distributed by us pursuant to FDA approvals are subject to pervasive and continuing regulation by the FDA, including, among other things, requirements relating to record-keeping, reporting of adverse experiences, periodic reporting, product sampling and distribution, and advertising and promotion of the product. After approval, most changes to the approved product, such as adding new indications or other labeling claims, are subject to prior FDA review and approval. There also are continuing, annual program fees for any marketed products. Biologic manufacturers and their subcontractors are required to register their establishments with the FDA and certain state agencies, and are subject to periodic unannounced inspections by the FDA and certain state agencies for compliance with cGMP, which impose certain procedural and documentation requirements upon us and our third-party manufacturers. Changes to the manufacturing process are strictly regulated, and, depending on the significance of the change, may require prior FDA approval before being implemented. FDA regulations also require investigation and correction of any deviations from cGMP and impose reporting requirements upon us and any third-party manufacturers that we may decide to use. Accordingly, manufacturers must continue to expend time, money and effort in the area of production and quality control to maintain compliance with cGMP and other aspects of regulatory compliance.

The FDA may withdraw approval if compliance with regulatory requirements and standards is not maintained or if problems occur after the product reaches the market. Later discovery of previously unknown problems with a product, including adverse events of unanticipated severity or frequency, or with manufacturing processes, or failure to comply with regulatory requirements, may result in revisions to the approved labeling to add new safety information; imposition of post-market studies or clinical studies to assess new safety risks; or imposition of distribution restrictions or other restrictions under a REMS program. Other potential consequences include, among other things:

- restrictions on the marketing or manufacturing of the product, complete withdrawal of the product from the market or product recalls;

- fines, warning letters or holds on post-approval clinical studies;
- refusal of the FDA to approve pending applications or supplements to approved applications, or suspension or revocation of product license approvals;
- product seizure or detention, or refusal to permit the import or export of products;
- consent decrees, corporate integrity agreements, debarment or exclusion from federal healthcare programs;
- mandated modification of promotional materials and labeling and the issuance of corrective information;
- the issuance of safety alerts, Dear Healthcare Provider letters, press releases and other communications containing warnings or other safety information about the product; or
- injunctions or the imposition of civil or criminal penalties.

The FDA closely regulates the marketing, labeling, advertising and promotion of biologics. A company can make only those claims relating to safety and efficacy, purity and potency that are approved by the FDA and in accordance with the provisions of the approved label. The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses. Failure to comply with these requirements can result in, among other things, adverse publicity, warning letters, corrective advertising and potential civil and criminal penalties. Physicians may prescribe legally available products for uses that are not described in the product's labeling and that differ from those tested by us and approved by the FDA. Such off-label uses are common across medical specialties. Physicians may believe that such off-label uses are the best treatment for many patients in varied circumstances. The FDA does not regulate the behavior of physicians in their choice of treatments. The FDA does, however, restrict manufacturer's communications on the subject of off-label use of their products.

Biosimilars and exclusivity

The Affordable Care Act, signed into law in 2010, includes a subtitle called the BPCIA, which created an abbreviated approval pathway for biological products that are biosimilar to or interchangeable with an FDA-licensed reference biological product. The FDA has issued several guidance documents outlining an approach to review and approval of biosimilars.

Biosimilarity, which requires that there be no clinically meaningful differences between the biological product and the reference product in terms of safety, purity, and potency, can be shown through analytical studies, animal studies, and a clinical study or studies. Interchangeability requires that a product is biosimilar to the reference product and the product must demonstrate that it can be expected to produce the same clinical results as the reference product in any given patient and, for products that are administered multiple times to an individual, the biologic and the reference biologic may be alternated or switched after one has been previously administered without increasing safety risks or risks of diminished efficacy relative to exclusive use of the reference biologic. However, complexities associated with the larger, and often more complex, structures of biological products, as well as the processes by which such products are manufactured, pose significant hurdles to implementation of the abbreviated approval pathway that are still being worked out by the FDA.

Under the BPCIA, an application for a biosimilar product may not be submitted to the FDA until four years following the date that the reference product was first licensed by the FDA. In addition, the approval of a biosimilar product may not be made effective by the FDA until 12 years from the date on which the reference product was first licensed. During this 12-year period of exclusivity, another company may still market a competing version of the reference product if the FDA approves a full BLA for the competing product containing that applicant's own preclinical data and data from adequate and well-controlled clinical trials to demonstrate

the safety, purity and potency of its product. The BPCIA also created certain exclusivity periods for biosimilars approved as interchangeable products. At this juncture, it is unclear whether products deemed “interchangeable” by the FDA will, in fact, be readily substituted by pharmacies, which are governed by state pharmacy law.

A biological product can also obtain pediatric market exclusivity in the United States. Pediatric exclusivity, if granted, adds six months to existing exclusivity periods and patent terms. This six-month exclusivity, which runs from the end of other exclusivity protection or patent term, may be granted based on the voluntary completion of a pediatric study in accordance with an FDA-issued “Written Request” for such a study.

The BPCIA is complex and continues to be interpreted and implemented by the FDA. In addition, government proposals have sought to reduce the 12-year reference product exclusivity period. Other aspects of the BPCIA, some of which may impact the BPCIA exclusivity provisions, have also been the subject of recent litigation. As a result, the ultimate impact, implementation, and impact of the BPCIA is subject to significant uncertainty.

Genetically engineered food products

In the United States, the FDA and the USDA are primarily responsible for overseeing food regulation and safety, although many other federal agencies also play a role in food regulation.

USDA has jurisdiction over certain genetically engineered crops through the Animal and Plant Health Inspection Services, or APHIS. Under the Plant Protection Act and APHIS’ Part 340 regulations, USDA requires anyone who wishes to import, transport interstate, or release into the environment a “regulated article” to apply for a permit or, in some cases, notify APHIS that the introduction will be made. Regulated articles are defined as “any organism which has been altered or produced through genetic engineering … which USDA determines is a plant pest or has reason to believe is a plant pest.” Regulated articles may be subject to extensive regulation, including both permitting requirements and inspections. However, to the extent products are subject to APHIS regulation, APHIS may make a determination of nonregulated status for a product following the submission of a petition requesting such a determination. The petition process can be a multi-year process that varies based on a number of factors, including APHIS’s familiarity with similar products, the type and scope of the environmental review conducted, and the number and types of public comments received. APHIS conducts a comprehensive science-based review of the petition to assess, among other things, plant pest risk, environmental considerations pursuant to the National Environmental Policy Act of 1969, or NEPA, and any potential impact on endangered species. If, upon the completion of the review, APHIS grants the petition, the product is no longer deemed a “regulated article” and the petitioner may commercialize the product, subject to any conditions set forth in the decision. In January 2017, APHIS proposed significant amendments to its Part 340 regulatory framework that would, among other things, clarify the types of genetically engineered plants subject to regulation thereunder. In November 2017, however, APHIS withdrew its proposed rule and stated that it would “begin a fresh stakeholder engagement aimed at exploring alternative policy approaches.” That process appears to remain ongoing.

On May 4, 2018, the USDA issued a proposed rule implementing the National Bioengineered Food Disclosure Standard, with a proposed compliance date of January 1, 2020. Under this proposed rule, the label of a bioengineered, or BE, food must include a disclosure that the food is a BE food or contains a BE ingredient, with certain exceptions. This proposed rule defines BE food as “a food that contains genetic material that was has been modified through in vitro recombinant deoxyribonucleic acid, or DNA, techniques and for which the modification could not otherwise be obtained through conventional breeding or found in nature,” except in the case of an incidental additive present in food at an insignificant level and that does not have any technical or functional effect in the food. The USDA’s proposed rule may change significantly prior to being finalized.

The FDA's oversight of food safety and security is primarily carried out by the Center for Food Safety and Applied Nutrition. To execute its responsibilities, the FDA conducts inspections and collects and analyzes product samples. Foods are typically not subject to premarket review and approval requirements, with limited exceptions, such as the requirement for premarket review and approval of food additives. Under Section 201(s) and 409 of the FDCA, any substance that is reasonably expected to become a component of food is considered a "food additive" that is subject to premarket approval by the FDA, unless it is already subject to a food additive regulation. Ingredients that are GRAS are exempt from the definition of food additive and from the premarket approval requirements. Under section 201(s), and FDA's implementing regulations, the use of a food substance may be GRAS either through a determination by qualified experts or, for a substance used in food before 1958, through experience based on common use in food.

Manufacturers of GRAS substances may voluntarily provide the FDA with a notification of GRAS determination, which includes, among other things, a description of the substance, the applicable conditions of use, the dietary exposure and an explanation of how the substance was determined to be safe for the intended use. Upon review of such a notification, the FDA may respond with a "no questions" letter stating that while it has not made its own GRAS determination, it has no questions at the time regarding the applicant's own GRAS determination. Alternatively, manufacturers may self-affirm that a given substance is GRAS without the voluntary FDA notification. A company may market a new food ingredient based on its independent determination that the substance is GRAS; however, the FDA can disagree with this determination and take enforcement action.

The FDA regulates foods made with genetically modified organisms under the approach summarized in its 1992 "Statement of Policy: Foods Derived from New Plant Varieties." Under this policy, updated in 2017, the FDA regulates foods derived from genetically modified plant varieties consistent with the framework for non-genetically modified foods. Under this framework, the FDA offers a voluntary consultation process to determine whether a food derived from a genetically modified plant variety raises any safety or other regulatory issues, such as whether any substance in the food from the plant may require premarket approval as a food additive.

Other U.S. healthcare laws and compliance requirements

In the United States, our activities are potentially subject to regulation under various federal and state healthcare laws including, among others, the federal Anti-Kickback Statute, the federal False Claims Act and HIPAA.

The U.S. federal Anti-Kickback Statute prohibits, among other things, any person or entity, from knowingly and willfully offering, paying, soliciting or receiving any remuneration, directly or indirectly, overtly or covertly, in cash or in kind, to induce or in return for purchasing, leasing, ordering or arranging for the purchase, lease or order of any item or service reimbursable under Medicare, Medicaid or other federal healthcare programs. The term remuneration has been interpreted broadly to include anything of value. A person does not need to have knowledge of the statute or specific intent to violate it to have committed a violation. In addition, the government may assert that a claim including items or services resulting from a violation of the U.S. federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the civil False Claims Act.

The U.S. federal civil and criminal false claims laws and civil monetary penalties laws, including the civil False Claims Act, which can be enforced through civil whistleblower or qui tam actions, prohibits, among other things, any person or entity from knowingly presenting, or causing to be presented, a false claim for payment to, or approval by, the federal government or knowingly making, using, or causing to be made or used a false record or statement material to a false or fraudulent claim to the federal government, or from knowingly making a false statement to avoid, decrease or conceal an obligation to pay money to the U.S. government.

The U.S. Health Insurance Portability and Accountability Act of 1996, or HIPAA, created additional federal criminal statutes that prohibit knowingly and willfully executing, or attempting to execute, a scheme to defraud or to obtain, by means of false or fraudulent pretenses, representations or promises, any money or property owned by, or under the control or custody of, any healthcare benefit program, including private third-party payors and knowingly and willfully falsifying, concealing or covering up by trick, scheme or device, a material fact or making any materially false, fictitious or fraudulent statement in connection with the delivery of or payment for healthcare benefits, items or services. Similar to the U.S. federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation.

HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009, or HITECH, and their implementing regulations, impose obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of individually identifiable health information without appropriate authorization by covered entities subject to the rule, such as health plans, healthcare clearinghouses and certain healthcare providers, as well as their business associates that perform certain services for or on their behalf involving the use or disclosure of individually identifiable health information.

Additionally, the federal Physician Payments Sunshine Act, and its implementing regulations, require that certain manufacturers of drugs, devices, biological and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program (with certain exceptions) to report annually to CMS information related to certain payments or other transfers of value made or distributed to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors) and teaching hospitals, or to entities or individuals at the request of, or designated on behalf of, the physicians and teaching hospitals and to report annually to CMS certain ownership and investment interests held by physicians and their immediate family members.

Moreover, analogous state and non-U.S. laws and regulations may apply to our activities, such as state anti-kickback and false claims laws, which may apply to our business practices, including, but not limited to, research, distribution, sales and marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers, or by the patients themselves, state laws that require pharmaceutical and device companies to comply with the industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the U.S. government, or otherwise restrict payments that may be made to healthcare providers and other potential referral sources, state laws and regulations that require manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures and pricing information, state and local laws which require the registration of pharmaceutical sales representatives and state and non-U.S. laws, such as the EU General Data Protection Regulation 2016/679, governing the privacy and security of health information in some circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

Efforts to ensure that current and future business arrangements with third parties complies with applicable healthcare laws and regulations involves substantial costs. If a business is found to be in violation of any of these or any other health regulatory laws that may apply to it, it may be subject to significant penalties, including the imposition of significant civil, criminal and administrative penalties, damages, monetary fines, disgorgement, individual imprisonment, possible exclusion from participation in Medicare, Medicaid and other U.S. healthcare programs, additional reporting requirements and oversight if subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance with these laws, contractual damages, reputational harm, diminished profits and future earnings, and curtailment or restructuring of operations.

Coverage, pricing and reimbursement

Significant uncertainty exists as to the coverage and reimbursement status for newly approved therapeutics. In the United States and markets in other countries, sales of any products for which we receive regulatory approval for commercial sale will depend, in part, on the extent to which third-party payors provide coverage, and establish adequate reimbursement levels for such products. In the United States, third-party payors include federal and state healthcare programs, private managed care providers, health insurers and other organizations. Third-party payors may limit coverage to specific products on an approved list, or also known as a formulary, which might not include all of the FDA-approved products for a particular indication. A payor's decision to provide coverage for a product does not imply that an adequate reimbursement rate will be approved. Further, one payor's determination to provide coverage for a product does not assure that other payors will also provide coverage for the product. Moreover, the coverage provided may be more limited than the purposes for which the product is approved by the FDA. It is also possible that a third-party payor may consider a product as substitutable and only offer to reimburse patients for the less expensive product. Adequate third-party payor reimbursement may not be available to enable us to maintain price levels sufficient to realize an appropriate return on our investment in product development. Coverage policies and third-party payor reimbursement rates may change at any time. Even if favorable coverage and reimbursement status is attained for one or more products for which we receive regulatory approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

Healthcare reform

In the United States and some foreign jurisdictions, there have been, and continue to be, several legislative and regulatory changes and proposed changes regarding the healthcare system that could prevent or delay marketing approval of product candidates, restrict or regulate post-approval activities, and affect the ability to profitably sell product candidates for which marketing approval is obtained. Among policy makers and payors in the United States and elsewhere, there is significant interest in promoting changes in healthcare systems with the stated goals of containing healthcare costs, improving quality and/or expanding access. The Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, collectively the Affordable Care Act, enacted in March 2010, has substantially changed healthcare financing and delivery by both governmental and private insurers. Among other things the Affordable Care Act included the following provisions:

- an annual, nondeductible fee on any entity that manufactures or imports certain specified branded prescription drugs and biologic agents apportioned among these entities according to their market share in some government healthcare programs;
- an increase in the statutory minimum rebates a manufacturer must pay under the Medicaid Drug Rebate Program;
- a new Medicare Part D coverage gap discount program, in which manufacturers must agree to offer 50% point-of-sale discounts, which through subsequent legislative amendments, will be increased to 70%, starting in 2019, off negotiated prices of applicable brand drugs to eligible beneficiaries during their coverage gap period, as a condition for the manufacturers' outpatient drugs to be covered under Medicare Part D;
- extension of manufacturers' Medicaid rebate liability to covered drugs dispensed to individuals who are enrolled in Medicaid managed care organizations;
- expansion of eligibility criteria for Medicaid programs;

- expansion of the entities eligible for discounts under the 340B Drug Discount Program;
- a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research;
- a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted, or injected; and
- a licensure framework for follow on biologic products.

Some of the provisions of the Affordable Care Act have yet to be implemented, and there have been legal and political challenges to certain aspects of the Affordable Care Act. Since January 2017, President Trump has signed two executive orders and other directives designed to delay, circumvent, or loosen certain requirements mandated by the Affordable Care Act. Concurrently, Congress has considered legislation that would repeal or repeal and replace all or part of the Affordable Care Act. While Congress has not passed comprehensive repeal legislation, two bills affecting the implementation of certain taxes under the Affordable Care Act have been signed into law. The Tax Cuts and Jobs Act of 2017 includes a provision repealing, effective January 1, 2019, the tax-based shared responsibility payment imposed by the Affordable Care Act on certain individuals who fail to maintain qualifying health coverage for all or part of a year that is commonly referred to as the “individual mandate.” Additionally, on January 22, 2018, President Trump signed a continuing resolution on appropriations for fiscal year 2018 that delayed the implementation of certain Affordable Care Act-mandated fees, including the so-called “Cadillac” tax on certain high cost employer-sponsored insurance plans, the annual fee imposed on certain health insurance providers based on market share. Further, the Bipartisan Budget Act of 2018, among other things, amends the Affordable Care Act, effective January 1, 2019, to close the coverage gap in most Medicare drug plans, commonly referred to as the “donut hole.” More recently, in July 2018, CMS published a final rule permitting further collections and payments to and from certain Affordable Care Act qualified health plans and health insurance issuers under the Affordable Care Act risk adjustment program in response to the outcome of federal district court litigation regarding the method CMS uses to determine this risk adjustment.

In addition, other legislative changes have been proposed and adopted since the Affordable Care Act was enacted. On August 2, 2011, the Budget Control Act of 2011 was signed into law, which, among other things, created the Joint Select Committee on Deficit Reduction to recommend to Congress proposals for spending reductions. The Joint Select Committee did not achieve a targeted deficit reduction of at least $1.2 trillion for the years 2013 through 2021, triggering the legislation’s automatic reduction to several government programs. This includes reductions to Medicare payments to providers of 2% per fiscal year, which went into effect on April 1, 2013 and, due to subsequent legislative amendments to the statute, including the BBA, will remain in effect through 2027 unless additional Congressional action is taken. On January 2, 2013, the American Taxpayer Relief Act of 2012 was signed into law, which, among other things, reduced Medicare payments to several providers, including hospitals, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years.

Further, there has been heightened governmental scrutiny recently over pharmaceutical pricing practices in light of the rising cost of prescription drugs and biologics. Such scrutiny has resulted in several recent Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for pharmaceutical products, some of which are included in the Trump administration’s budget proposal for fiscal year 2019. Additionally, the Trump administration released a “Blueprint” to lower drug prices and reduce out of pocket costs of drugs that contains additional proposals to increase manufacturer competition, increase the negotiating power of certain federal

healthcare programs, incentivize manufacturers to lower the list price of their products and reduce the out of pocket costs of drug products paid by consumers. The U.S. Department of Health and Human Services has begun the process of soliciting feedback on some of these measures and, at the same, is immediately implementing others under its existing authority. Although a number of these, and other potential, proposed measures will require authorization through additional legislation to become effective, Congress and the Trump administration have each indicated that it will continue to seek new legislative and/or administrative measures to control drug costs. At the state level, legislatures have increasingly passed legislation and implemented regulations designed to control pharmaceutical product and medical device pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. In addition, regional healthcare authorities and individual hospitals are increasingly using bidding procedures to determine what pharmaceutical products and medical devices to purchase and which suppliers will be included in their prescription drug and other healthcare programs.

Additionally, on May 30, 2018, the Right to Try Act was signed into law. The law, among other things, provides a federal framework for certain patients to access certain investigational new drug products that have completed a Phase 1 clinical trial and that are undergoing investigation for FDA approval. Under certain circumstances, eligible patients can seek treatment without enrolling in clinical trials and without obtaining FDA permission under the FDA expanded access program. There is no obligation for a drug manufacturer to make its drug products available to eligible patients as a result of the Right to Try Act.

Facilities

We currently occupy approximately 49,000 square feet of office and laboratory space at our corporate headquarters in Durham, North Carolina under a lease that expires in 2024. This lease provides us the option to lease an additional 20,000 square feet of office space. We also occupy approximately 15,500 square feet of laboratory and office space in Research Triangle Park, North Carolina under a lease that expires in 2026, and we occupy approximately 17,300 square feet of laboratory and office space in Research Triangle Park, North Carolina under a lease that expires in 2026. We believe that our facilities are sufficient to meet our current needs and that suitable additional space will be available as and when needed.

Employees

As of December 31, 2018, we had 127 full-time Precisioneers, over half of whom have advanced degrees, including 49 with Ph.D. degrees. Of these full-time employees, 94 are engaged in research and development activities. None of our employees is represented by a labor union or covered by a collective bargaining agreement. We consider our relationships with our employees to be good.

Legal proceedings

We are not currently party to any material legal proceedings.

Management

Executive officers and directors

The following table sets forth the name, age and position of each of our executive officers and directors as of the date of this prospectus.

Name	Age	Position
Executive officers		
Matthew Kane	42	President, Chief Executive Officer and Director
Derek Jantz, Ph.D.	43	Chief Scientific Officer and Director
Abid Ansari	41	Chief Financial Officer
Fayaz Khazi, Ph.D.	46	Chief Executive Officer, Elo Life Systems
David Thomson, Ph.D.	58	Chief Development Officer
Non-employee directors		
Robert Adelman, M.D.(1)	56	Director
Raymond Schinazi, Ph.D.(2)(3)	68	Director
Shalini Sharp(1)(2)	44	Director
Tony Yao, M.D., Ph.D.(1)(2)(3)	47	Director

(1) Member of the audit committee.

(2) Member of the compensation committee.

(3) Member of the nominating and corporate governance committee.

Executive officers

Matthew Kane, a co-founder of Precision, has served as our President and Chief Executive Officer and a director since our inception in 2006. Mr. Kane has nearly 20 years of experience in the life sciences industry, most of which has been spent specifically working in genome editing. Prior to co-founding Precision, Mr. Kane was with Suros Surgical Systems. Mr. Kane received a B.S. in mechanical engineering and an M.S. in biomedical engineering from the Rose-Hulman Institute of Technology and an M.B.A. from Duke University.

We believe that Mr. Kane is qualified to serve on our board of directors because of the perspective and experience he provides as one of our founders and as our President and Chief Executive Officer, as well as his many years of experience within the life sciences and agricultural biotechnology industries.

Derek Jantz, *Ph.D.*, a co-founder of Precision, has been our Chief Scientific Officer since August 2013 and has served on our board of directors since January 2006. He previously served as our Vice President of Scientific Development from our inception to August 2013. Dr. Jantz is the co-inventor of several of our foundational patents and other intellectual property. As a protein engineer, he was an early developer of zinc finger technology and has spent most of his research career designing proteins for genome editing applications. Dr. Jantz received a B.A. in biology from the University of Colorado at Boulder and a Ph.D. in biophysics from the Johns Hopkins University School of Medicine.

We believe that Dr. Jantz's extensive experience in genome editing and as an inventor of ARCUS, in addition to his perspective as one of our founders and senior executives, qualifies him to serve on our board of directors.

Abid Ansari has served as our Chief Financial Officer since February 2019. Mr. Ansari previously served as our Vice President, Finance & Operations from July 2016 to February 2019. Prior to joining us, Mr. Ansari served as Senior Director, Deal Finance and M&A from November 2013 to July 2016 and Senior Director, Head of Portfolio Analysis Group from September 2011 to November 2013 for GlaxoSmithKline plc. Before that, he served for five years in commercial and capital finance roles at MedImmune, LLC and three years as a plant controller at Uniqema (previously a division of Imperial Chemical Industries Plc). Mr. Ansari received a B.S. in chemical engineering and an M.B.A. from Purdue University. Mr. Ansari is also a Certified Public Accountant.

Fayaz Khazi, *Ph.D.*, has served as the CEO of our food-focused subsidiary, Elo Life Systems, since May 2018 and, prior to that, served as President of Elo Life Systems beginning in May 2017. From May 2014 to April 2017, Dr. Khazi served as the CEO of Key Gene USA. Dr. Khazi also held several executive leadership positions at Intrexon Corporation directing translation programs in the food, human health and agricultural biotechnology sectors, including serving as Vice President, Business Analytics and Strategy from January 2012 to January 2014, and also serving as Intrexon's founding Director of Translational Medicine. Dr. Khazi received a B.Sc. from the University of Agricultural Sciences, Bangalore, and a Ph.D. in biological sciences from Auburn University. He trained as a Howard Hughes Medical Institute post-doctoral fellow and a senior researcher at the Children's Hospital of Philadelphia, where he studied the genotoxicity of gene therapy vectors and developed *in vivo* genome-editing technologies to treat genetic diseases.

David Thomson, Ph.D., has served as our Chief Development Officer since June 2017. Prior to joining us, he served as Senior Vice President Research and Nonclinical Development for Shire plc beginning in May 2016 until May 2017 where he was responsible for the strategy and operational direction of the Global Research and Nonclinical Development Organization, including transitioning programs from research into clinical development and support of programs through commercialization. Prior to that, he served as Senior Vice President and Global Head, Research and Development Operations for Shire from February 2015 to May 2016. From May 2014 to January 2015, Dr. Thomson served as the Director of the Biomanufacturing Research Institute and Technology Enterprise and a Professor in the Department of Pharmaceutical Sciences of North Carolina Central University. From September 2012 to April 2014, Dr. Thomson served as Vice President, Shire Human Genetic Therapies and later Senior Vice President, Global Head of Research and Nonclinical Development for Shire plc. He received a B.Sc. in chemistry from the University of Strathclyde and a Ph.D. in organic chemistry from the University of Toronto, and he completed post-doctoral work at Yale University.

Non-employee directors

Robert Adelman, M.D., has served on our board of directors since April 2015. Since 2011, Dr. Adelman has been Managing Partner of venBio Partners LLC, a venture capital firm Dr. Adelman founded in 2011. Dr. Adelman currently serves on the board of directors of Metacrine, Inc., ALX Oncology and TP Therapeutics, Inc. Prior to founding venBio, Dr. Adelman had a seven-year tenure as a Private Equity Partner at OrbiMed Advisors LLC. Dr. Adelman has also previously co-founded a number of biotechnology companies and practiced surgery in New York and New Jersey. Dr. Adelman received a B.A. in biochemistry from the University of California at Berkeley and a M.D. from Yale University, and he completed his residency at Cornell University Medical Center.

We believe that Dr. Adelman's medical background and experience in the venture capital industry, particularly with biotechnology and pharmaceutical companies, qualify him to serve as a member of our board of directors.

Raymond Schinazi, Ph.D., D.Sc., has served on our board of directors since March 2019. Since 1992, Dr. Schinazi has been the Frances Winship Walters Professor of Pediatrics and Director of the Laboratory of Biochemical Pharmacology at Emory University. From November 2014 to February 2019, Dr. Schinazi served on the board of directors of Cocrystal Pharma, Inc. Dr. Schinazi was also instrumental in the founding of a number of biotechnology companies, including Triangle Pharmaceuticals, Idenix Pharmaceuticals and Pharmasset, Inc.

Dr. Schinazi currently serves on the board of directors of Brace Pharma Capital, ReViral Pharmaceuticals Ltd, Gliknik Inc., and serves on the board of trustees of amfAR, ICMEC and GVN. Dr. Schinazi is also a Charter Fellow of the National Academy of Inventors and a Fellow of the American Society of Microbiology. Dr. Schinazi received a B.Sc. and Ph.D. in chemistry and D.Sc. in biotechnology from the University of Bath.

We believe that Dr. Schinazi's medical background and biotechnology experience qualify him to serve as a member of our board of directors.

Shalini Sharp has served on our board of directors since December 2018. Since 2012, Ms. Sharp has served as Executive Vice President and Chief Financial Officer of Ultragenyx Pharmaceutical Inc., a biopharmaceutical company. Between May 2012 and January 2016, she served as Senior Vice President of Ultragenyx. Prior to Ultragenyx, Ms. Sharp served in various executive capacities, and ultimately as Chief Financial Officer, of Agenus Inc., a biotechnology company, from August 2003 until May 2012. Ms. Sharp currently serves on the board of directors of Array BioPharma Inc. and Sutro Biopharma, Inc. and previously served on the board of directors of Agenus, Inc. from May 2012 to June 2018. Ms. Sharp received a B.A. in English literature and an M.B.A. from Harvard University.

We believe that Ms. Sharp's more than 20 years of experience in the life sciences industry including both executive and board roles as well as her expertise in biotechnology, corporate strategy and finance qualify her to serve as a member of our board of directors.

Tony Yao, M.D., Ph.D., has served on our board of directors since May 2018. Since April 2012, Dr. Yao has served as a portfolio manager at ArrowMark Partners, where he leads the healthcare team and manages the healthcare portfolio. Dr. Yao currently serves on the board of directors of 4D Molecular Therapeutics, Inc. and NexImmune, Inc. Dr. Yao began his investment career in February 2002 as an analyst and later an assistant portfolio manager at Janus Capital Group. Dr. Yao received a B.Sc. in biochemistry from Brown University and a M.D. and Ph.D. in immunology from Stanford University.

We believe that Dr. Yao's medical background and experience in private equity investing, particularly with healthcare companies, qualify him to serve as a member of our board of directors.

Board composition and election of directors

The primary responsibility of our board of directors is to provide oversight, strategic guidance, counseling and direction to our management. Our board of directors meets on a regular basis and additionally as required. Our board of directors currently consists of six directors. The members of our board of directors were elected in compliance with the provisions of our amended and restated certificate of incorporation in effect at such time and an amended and restated voting agreement, which we refer to as our voting agreement, among us and certain of our stockholders. Our voting agreement will terminate upon the closing of this offering and none of our stockholders will have any special rights regarding the election or designation of members of our board of directors following the closing of this offering. See "Certain relationships and related party transactions—Voting agreement" for a discussion of our voting agreement.

Director independence

Our board of directors has determined that, of our six directors, Robert Adelman, M.D., Raymond Schinazi Ph.D., Shalini Sharp and Tony Yao, M.D., Ph.D. do not have a relationship that would interfere with the exercise of independent judgment in carrying out the responsibilities of a director and that each of these directors is "independent" as that term is defined under the applicable listing rules of The Nasdaq Stock Market LLC, or the Nasdaq rules. There are no family relationships among any of our directors or executive officers.

Classified board of directors

In accordance with our amended and restated certificate of incorporation that will go into effect upon the closing of this offering, our board of directors will be divided into three classes with staggered, three-year terms. At each annual meeting of stockholders, the successors to directors whose terms then expire will be elected to serve from the time of election and qualification until the third annual meeting following election. Upon the effectiveness of the registration statement of which this prospectus forms a part, our directors will be divided among the three classes as follows:

- the Class I directors will be Raymond Schinazi, Ph.D. and Matthew Kane, and their terms will expire at our first annual meeting of stockholders following this offering;
- the Class II directors will be Tony Yao, M.D., Ph.D. and Derek Jantz, and their terms will expire at our second annual meeting of stockholders following this offering; and
- the Class III directors will be Robert Adelman, M.D. and Shalini Sharp, and their terms will expire at the third annual meeting of stockholders following this offering.

Our amended and restated certificate of incorporation and amended and restated bylaws that will go into effect upon the closing of this offering will provide that the authorized number of directors may be changed only by resolution of the board of directors. Any additional directorships resulting from an increase in the number of directors will be distributed among the three classes so that, as nearly as possible, each class will consist of one-third of the directors. The division of our board of directors into three classes with staggered three-year terms may delay or prevent a change of our management or a change in control of our company. Our directors may be removed only for cause by the affirmative vote of the holders of at least two-thirds of our outstanding voting stock entitled to vote in the election of directors.

Role of the board in risk oversight

One of the key functions of our board of directors is informed oversight of our risk management process. Our board of directors does not have a standing risk management committee, but rather administers this oversight function directly through our board of directors as a whole, as well as through various standing committees of our board of directors that address risks inherent in their respective areas of oversight. In particular, our board of directors is responsible for monitoring and assessing strategic risk exposure and our audit committee has the responsibility to consider and discuss our major financial risk exposures and the steps our management has taken to monitor and control these exposures, including guidelines and policies to govern the process by which risk assessment and management are undertaken. Our audit committee also monitors compliance with legal and regulatory requirements. Our nominating and corporate governance committee monitors the effectiveness of our corporate governance practices, including whether they are successful in preventing illegal or improper liability-creating conduct. Our compensation committee assesses and monitors whether any of our compensation policies and programs has the potential to encourage excessive risk-taking. While each committee is responsible for evaluating certain risks and overseeing the management of such risks, our entire board of directors is regularly informed through committee reports about such risks.

Board committees

Our board of directors has established three standing committees—audit, compensation, and nominating and corporate governance—each of which operates under a charter that has been approved by our board of directors. Upon our listing on The Nasdaq Global Market, each committee's charter will be available under the Corporate Governance section of our website at www.precisionbiosciences.com. The reference to our website

address does not constitute incorporation by reference of the information contained at or available through our website, and you should not consider it to be a part of this prospectus.

Audit committee

Our audit committee's responsibilities include:

- appointing, approving the compensation of and assessing the independence of our registered public accounting firm;
- overseeing the work of our independent registered public accounting firm, including through the receipt and consideration of reports from such firm;
- reviewing and discussing with management and our independent registered public accounting firm our annual and quarterly financial statements and related disclosures;
- coordinating our board of directors' oversight of our internal control over financial reporting, disclosure controls and procedures and code of business conduct and ethics;
- establishing procedures for the receipt, retention and treatment of complaints we receive regarding financial controls, accounting or auditing matters and other matters;
- discussing our risk management policies;
- meeting independently with our internal auditing staff, if any, independent registered public accounting firm and management;
- reviewing on a periodic basis our investment policy;
- reviewing and approving or ratifying any related person transactions; and
- preparing the audit committee report required by SEC rules.

The members of our audit committee are Shalini Sharp, Tony Yao, M.D., Ph.D. and Robert Adelman, M.D. Shalini Sharp serves as the chairperson of the committee. All members of our audit committee meet the requirements for financial literacy under the Nasdaq rules. Our board of directors has determined that Shalini Sharp, Tony Yao, M.D., Ph.D. and Robert Adelman, M.D. each meet the independence requirements of Rule 10A-3 under the Exchange Act and the applicable Nasdaq rules. Our board of directors has determined that Shalini Sharp is an "audit committee financial expert" as defined by applicable SEC rules and has the requisite financial sophistication as defined under the applicable Nasdaq rules.

Compensation committee

Our compensation committee's responsibilities include:

- reviewing and approving, or recommending for approval by the board of directors, the compensation of our CEO and our other executive officers;
- overseeing and administering our cash and equity incentive plans;
- reviewing and making recommendations to our board of directors with respect to director compensation;
- reviewing and discussing annually with management our "Compensation discussion and analysis," to the extent required; and
- preparing the annual compensation committee report required by SEC rules, to the extent required.

The members of our compensation committee are Raymond Schinazi, Ph.D., Shalini Sharp and Tony Yao, M.D., Ph.D. Raymond Schinazi serves as the chairperson of the committee. Our board of directors has determined that Raymond Schinazi, Ph.D., Shalini Sharp and Tony Yao, M.D., Ph.D. are each independent under the applicable Nasdaq rules, including the Nasdaq rules specific to membership on our compensation committee, and is a "non-employee director" as defined in Rule 16b-3 promulgated under the Exchange Act.

Nominating and corporate governance committee

Our nominating and corporate governance committee's responsibilities include:

- identifying individuals qualified to become board members;
- recommending to our board of directors the persons to be nominated for election as directors and to each board committee;
- developing and recommending to our board of directors corporate governance guidelines, and reviewing and recommending to our board of directors proposed changes to our corporate governance guidelines from time to time; and
- overseeing a periodic evaluation of our board of directors.

The members of our nominating and corporate governance committee are Matthew Kane, Raymond Schinazi, Ph.D. and Tony Yao, M.D., Ph.D. Matthew Kane serves as the chairperson of the committee. Our board of directors has determined that Raymond Schinazi, Ph.D., and Tony Yao, M.D., Ph.D. are each independent under the applicable Nasdaq rules. We are permitted to phase in our compliance with the independent nominating and corporate governance committee requirements set forth by the Nasdaq listing standards as follows: (1) one independent member at the time of listing, (2) a majority of independent members within 90 days of listing and (3) all independent members within one year of listing. Within one year of our listing on The Nasdaq Global Market, we expect that Mr. Kane will have resigned from our nominating and corporate governance committee and that any new directors added to the nominating and corporate governance committee will be independent under Nasdaq listing rules.

Compensation committee interlocks and insider participation

No member of our compensation committee is or has been our current or former officer or employee. None of our executive officers served as a director or a member of a compensation committee (or other committee serving an equivalent function) of any other entity, one of whose executive officers served as a director or member of our compensation committee during the fiscal year ended December 31, 2018.

Code of ethics and code of conduct

We have adopted a written code of business conduct and ethics that applies to our directors, officers and employees, including our principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions. Upon our listing on The Nasdaq Global Market, our code of business conduct and ethics will be available under the Corporate Governance section of our website at www.precisionbiosciences.com. In addition, we intend to post on our website all disclosures that are required by law or the Nasdaq rules concerning any amendments to, or waivers from, any provision of the code. The reference to our website address does not constitute incorporation by reference of the information contained at or available through our website, and you should not consider it to be a part of this prospectus.

Executive compensation

This section discusses the material components of our 2018 compensation program for our principal executive officer and next two most highly compensated executive officers who are named in the Summary compensation table below. These “named executive officers” and their positions are:

- Matthew Kane, President and Chief Executive Officer;
- Abid Ansari, Chief Financial Officer; and
- David Thomson, Chief Development Officer.

This discussion may contain forward-looking statements that are based on our current plans, considerations, expectations and determinations regarding future compensation programs. Actual compensation programs that we adopt following the completion of this offering may differ materially from the currently planned programs summarized in this discussion.

Summary compensation table

The following table sets forth information concerning the compensation of our named executive officers for the years ended December 31, 2017 and 2018:

Name and principal position	Year	Salary ($)	Bonus ($)(1)	Option awards ($)(2)	All other compensation($)	Total ($)
Matthew Kane	2018	350,000	157,500	1,068,616	11,016(3)	1,587,131
President and Chief Executive Officer	2017	350,000	124,900	18,041	8,863	501,804
Abid Ansari	2018	250,000	87,500	1,068,616	10,048(5)	1,416,164
Chief Financial Officer(4)						
David Thomson	2018	355,000	124,250	1,367,919	11,000(6)	1,858,169
Chief Development Officer	2017	176,346	176,000	173,178	16,962	542,486

(1) The amounts reported represent bonuses based upon our board’s assessment of the achievement of company and individual performance objectives for 2018, which were paid in January 2019.

(2) The amounts reported reflect the grant date fair value of stock options computed in accordance with Accounting Standards Codification 718, Compensation—Stock Compensation, or ASC 718, rather than the amounts paid to or realized by the named individual. We provide information regarding the assumptions used to calculate the value of the option awards in Note 7 to our consolidated financial statements included in this prospectus.

(3) The amount reported includes 401(k) matching contributions by us of $11,000 and tax gross-ups of $16 in connection with nondiscriminatory wellness reimbursements for 2018.

(4) Mr. Ansari was not one of our named executive officers in 2017, and accordingly, compensation information for 2017 is not included in the table above.

(5) The amount reported includes 401(k) matching contributions by us of $10,000 and tax gross-ups of $48 in connection with nondiscriminatory wellness reimbursements.

(6) The amount reported in 2018 represents 401(k) matching contributions by us of $11,000.

Annual base salaries

Our named executive officers receive a base salary to compensate them for services rendered to us. The base salary payable to each named executive officer is intended to provide a fixed component of compensation reflecting the executive’s skill set, experience, role and responsibilities. None of our named executive officers is currently party to an employment agreement or other agreement or arrangement that provides for automatic

or scheduled increases in base salary. The following table shows the annual base salaries for 2017, 2018 and 2019 of our named executive officers:

Name and principal position	2017 Base salary ($)	2018 Base salary ($)	2019 Base salary ($) (1)
Matthew Kane President and Chief Executive Officer	350,000	350,000	523,000
Abid Ansari Chief Financial Officer	235,000	250,000	316,000
David Thomson Chief Development Officer	350,000	355,000	370,000

(1) These amounts reflect base salaries effective upon the effectiveness of the registration statement of which this prospectus forms a part. See "—Employment agreements."

Bonuses

In addition to base salaries, our named executive officers were eligible to receive a cash bonus based on company and individual performance for 2018. Pursuant to the employment arrangements entered into with our named executive officers, during 2018 Mr. Kane was eligible to receive an annual bonus of up to 30% of his base salary; Mr. Ansari was eligible to receive an annual bonus in the discretion of our board; and Dr. Thomson was eligible to receive an annual bonus of up to 35% of his base salary. In January 2019, we paid performance bonuses of $157,500 to Mr. Kane, $87,500 to Mr. Ansari and $124,250 to Dr. Thomson with respect to 2018. Upon the effectiveness of the registration statement of which this prospectus forms a part, Mr. Kane, Mr. Ansari and Dr. Thomson will be eligible to receive an annual bonus of up to 50%, 35% and 35% of their respective base salaries. See "—Employment agreements."

Equity compensation

Our equity award program is the primary vehicle for offering long-term incentives to our executives. We believe that equity awards provide our executives with a strong link to our long-term performance, create an ownership culture and help to align the interests of our executives and our stockholders. To date, we have used stock option grants for this purpose because we believe they are an effective means by which to align the long-term interests of our executive officers with those of our stockholders. The use of options also can provide tax and other advantages to our executive officers relative to other forms of equity compensation. We believe that our equity awards are an important retention tool for our executive officers, as well as for our other employees.

We award stock options broadly to our employees, including to our non-executive employees. Grants to our executives and other employees are made at the discretion of our board of directors and are not made at any specific time period during a year.

We granted the following stock options to our named executive officers during 2018 under our 2015 Plan, which is described below:

Named executive officers	Stock options granted
Matthew Kane	140,535
Abid Ansari	140,535
David Thomson	187,381

In connection with this offering, we adopted our 2019 Plan to facilitate the grant of cash and equity incentives to directors, employees (including our named executive officers) and consultants of our company and to enable

our company to obtain and retain services of these individuals, which we believe are essential to our long-term success. Following the effective date of our 2019 Plan, we will not make any further grants under our 2015 Plan. However, our 2015 Plan will continue to govern the terms and conditions of the outstanding awards granted under it. For additional information about our 2019 Plan, see "—Incentive plans" below.

Retirement plans

We currently maintain the Precision BioSciences, Inc. 401(k) Plan, a defined contribution retirement savings plan, or the 401(k) Plan, for the benefit of our employees, including our named executive officers, who satisfy certain eligibility requirements. Our named executive officers are eligible to participate in the 401(k) Plan on the same terms as other full-time employees. The Code allows eligible employees to defer a portion of their compensation, within prescribed limits, on a pre-tax basis through contributions to the 401(k) Plan. We have historically matched participants' elective salary deferral contributions to the 401(k) Plan up to 50% of the first 4% of the employee's salary deferred. Matching contributions made by us vest 25% each year and are fully vested after four years. We believe that providing a vehicle for tax-deferred retirement savings though our 401(k) Plan, and making matching contributions, adds to the overall desirability of our executive compensation package and further incentivizes our employees, including our named executive officers, in accordance with our compensation policies.

Employee benefits and perquisites

Our named executive officers are eligible to participate in our employee benefit plans and programs, which include medical, dental and vision benefits, health and flexible spending accounts, life, short-term, long-term and supplemental individual disability, and supplemental insurance and wellness and tuition reimbursement to the same extent as our other full-time employees generally, subject to the terms and eligibility requirements of those plans. We also provide Messrs. Kane and Ansari and Dr. Thomson, along with certain other executive officers and senior employees, with certain supplemental disability insurance benefits. We also provide relocation benefits to our named executive officers as determined in our board's discretion.

Outstanding equity awards at 2018 fiscal year-end

The following table summarizes the number of shares of common stock underlying outstanding equity incentive plan awards for each of our named executive officers as of December 31, 2018.

	Option awards			
Name	**Number of securities underlying unexercised options (#) exercisable**	**Number of securities underlying unexercised options (#) unexercisable**	**Option exercise price ($)**	**Option expiration date**
Matthew Kane	322,711	—	0.04	5/17/2021
	10,247	13,175(1)	1.18	3/23/2027
	—	140,535(2)	11.98	9/27/2028
Abid Ansari	79,051	61,484(3)	1.20	8/10/2026
	6,148	7,905(1)	1.18	3/23/2027
	—	140,535(2)	11.98	9/27/2028
David Thomson	87,834	146,392(1)	1.18	6/29/2027
	63,709	123,672(2)	11.98	9/27/2028

(1) Award vested as to 25% of the underlying shares on March 24, 2018 with respect to Mr. Kane, March 24, 2018 with respect to Mr. Ansari and May 31, 2018 with respect to Dr. Thomson and will vest in equal installments at the end of each three-month period over the following 36 months, subject to the named executive officer's continued employment with us.
(2) Award vests as to 25% of the underlying shares on September 28, 2019 and in equal installments at the end of each three-month period over the following 36 months for Messrs. Kane and Ansari and vested as to 34% of the underlying shares on October 12, 2018, and will vest in equal installments at the end of each three-month period over the following 24 months for Dr. Thomson, in each case subject to the named executive officer's continued employment with us.
(3) Award vested as to 25% of the underlying shares on August 11, 2017 and will vest in equal installments at the end of each three-month period over the following 36 months, subject to the named executive officer's continued employment with us.

Employment agreements

In February 2019, we entered into new employment agreements with each of our named executive officers that set forth the terms and conditions of each executive's employment with us.

Each employment agreement establishes an annual base salary for each named executive officer, which is subject to our discretionary review and adjustment in accordance with our policies, procedures and practices as they may exist from time to time provided that no named executive officer's base salary may be decreased unless the decrease is an across-the-board decrease in the base salaries of all senior management employees of our company. See "Summary compensation table—Annual base salaries" above for the base salaries in effect for 2018 and 2019. Each of our named executive officers is also eligible to receive an annual bonus in the discretion of our board. Effective as of the closing of this offering, the employment agreements with each executive officer provide for new terms for base salary and bonus potential. Mr. Kane's annual base salary will be $523,000; Mr. Ansari's annual base salary will be $316,000; and Mr. Thomson's annual base salary will be $370,000. Mr. Kane will be eligible to receive an annual bonus of up to 50% of his base salary, Mr. Ansari will be eligible to receive an annual bonus of up to 35% of his base salary, and Dr. Thomson will be eligible to receive an annual bonus of up to 35% of his base salary. The named executive officers are eligible to participate in all medical, dental and disability insurance, the 401(k), personal leave and other employee benefit plans and programs for which the named executive officer is eligible, subject to the terms and conditions of such plans and programs. Each employment agreement further provides for the reimbursement of reasonable and necessary business expenses actually incurred by the named executive officer in performing services for us.

Each named executive officer's employment agreement and employment are terminable by either the named executive officer or us without cause on 30-days' notice, or upon shorter notice by us for cause. In the event that a named executive officer's employment is terminated by us without cause or by the executive for good reason, in each case as defined in the employment agreements, then in addition to any accrued amounts and subject to such named executive officer's timely executing a release of claims and continuing to comply with obligations under his proprietary information, inventions, non-competition and non-solicitation agreement, he will be entitled to receive (1) payment of an amount equal to 12 months of the named executive officer's base salary in the case of Mr. Kane or nine months in the case of Mr. Ansari and Dr. Thomson, paid in substantially similar installments on same payroll applicable to him immediately prior to his separation from service, subject to certain exceptions, and (2) reimbursement for additional costs the executive incurs for continued coverage under our group health insurance under the Consolidated Budget Reconciliation Act of 1985, or COBRA, for the applicable severance period or, if sooner, until comparable coverage is available in connection with subsequent employment. Upon termination of the employment of any of the named executive officers by us for cause or due to death or disability, or termination of employment by a named executive officer other than for good reason, the named executive officer will not be entitled to any additional compensation beyond any earned but unpaid salary or other accrued obligations.

Notwithstanding the foregoing, the employment agreements provide that, in the event a named executive officer's employment is terminated by us without cause or by the named executive officer for good reason three months prior or 12 months after the occurrence of a change in control, as defined in the employment

agreements, then, subject to his timely executing a release of claims and continuing to comply with obligations under his proprietary information, inventions, non-competition and non-solicitation agreement, then such named executive officer shall be entitled to (1) in the case of Mr. Kane, an amount equal to 18 months of his then current monthly base salary plus 1.5 times his target bonus for the year during which separation occurs, payable in a lump sum, and in the case of Mr. Ansari and Dr. Thomson, 12 months of monthly base salary plus one times their target bonus for the year, payable in a lump sum, (2) reimbursement of the additional costs the executive incurs for continued coverage under our group health insurance under COBRA until, in the case of Mr. Kane, the 18-month anniversary of the executive's separation date, and in the case of Mr. Ansari and Dr. Thomson, the 12-month anniversary of the executive's separation date, or earlier if the executive becomes eligible to receive substantially similar coverage from another source or is no longer eligible to receive COBRA, and (3) accelerated vesting of all unvested time-based equity grants.

Under the separate proprietary information, inventions, non-competition and non-solicitation agreement with each of Mr. Kane, Mr. Ansari and Dr. Thomson, each named executive officer has agreed to refrain from competing with us or soliciting our employees, in each case, while employed and following the termination of his employment for any reason for a period of one year and has acknowledged our ownership rights in any intellectual property and assigned any such ownership rights to us.

Incentive plans

The following summarizes the material terms of the long-term incentive compensation plan in which our named executive officers will be eligible to participate following the consummation of this offering and our 2015 Plan and 2006 Plan under which we have previously made periodic grants of equity and equity-based awards to our named executive officers and other key employees.

2019 Incentive award plan

In connection with this offering, we adopted and our stockholders approved our 2019 Plan to be effective upon the effectiveness of the registration statement of which this prospectus forms a part, under which we may grant cash and equity-based incentive awards to eligible service providers in order to attract, retain and motivate the persons who make important contributions to our company. The material terms of our 2019 Plan are summarized below.

Eligibility and administration

Our employees, consultants and directors, and employees and consultants of our subsidiaries, will be eligible to receive awards under our 2019 Plan. Our 2019 Plan will be administered by our board of directors, which may delegate its duties and responsibilities to one or more committees of our directors and/or officers (referred to collectively as the plan administrator below), subject to the limitations imposed under our 2019 Plan, Section 16 of the Exchange Act, stock exchange rules and other applicable laws. The plan administrator will have the authority to take all actions and make all determinations under our 2019 Plan, to interpret our 2019 Plan and award agreements and to adopt, amend and repeal rules for the administration of our 2019 Plan as it deems advisable. The plan administrator will also have the authority to determine which eligible service providers receive awards, grant awards and set the terms and conditions of all awards under our 2019 Plan, including any vesting and vesting acceleration provisions, subject to the conditions and limitations in our 2019 Plan.

Shares available for awards

An aggregate of 4,750,000 shares of our common stock will initially be available for issuance under our 2019 Plan. The number of shares initially available for issuance will be increased by an annual increase on January 1

of each calendar year beginning in 2020 and ending in and including 2029, equal to the least of (1) 4% of the shares outstanding on the final day of the immediately preceding calendar year and (2) a smaller number of shares determined by our board of directors. No more than 5,000,000 shares of common stock may be issued under our 2019 Plan upon the exercise of incentive stock options, or ISOs. Shares issued under our 2019 Plan may be authorized but unissued shares, shares purchased on the open market or treasury shares.

If an award under our 2019 Plan, our 2015 Plan or our 2006 Plan expires, lapses or is terminated, exchanged for cash, surrendered, repurchased, canceled without having been fully exercised or forfeited, any unused shares subject to the award will, as applicable, become or again be available for new grants under our 2019 Plan. Awards granted under our 2019 Plan in substitution for any options or other stock or stock-based awards granted by an entity before the entity's merger or consolidation with us or our acquisition of the entity's property or stock will not reduce the shares available for grant under our 2019 Plan, but will count against the maximum number of shares that may be issued upon the exercise of ISOs, as applicable.

In addition, the maximum aggregate grant date fair value as determined in accordance with ASC 718 (or any successor thereto), of awards granted to any non-employee director for services as a director pursuant to our 2019 Plan during any fiscal year may not exceed $750,000. The plan administrator may, however, make exceptions to such limit on director compensation in extraordinary circumstances, subject to the limitations in our 2019 Plan.

Awards

Our 2019 Plan provides for the grant of stock options, including ISOs, and nonqualified stock options, or NSOs, stock appreciation rights, or SARs, restricted stock, dividend equivalents, restricted stock units, or RSUs, and other stock or cash based awards. Certain awards under our 2019 Plan may constitute or provide for payment of "nonqualified deferred compensation" under Section 409A of the Code. All awards under our 2019 Plan will be set forth in award agreements, which will detail the terms and conditions of awards, including any applicable vesting and payment terms and post-termination exercise limitations. A brief description of each award type follows.

- Stock Options and SARs. Stock options provide for the purchase of shares of our common stock in the future at an exercise price set on the grant date. ISOs, by contrast to NSOs, may provide tax deferral beyond exercise and favorable capital gains tax treatment to their holders if certain holding periods and other requirements of the Code are satisfied. SARs entitle their holder, upon exercise, to receive from us an amount equal to the appreciation of the shares subject to the award between the grant date and the exercise date. The plan administrator will determine the number of shares covered by each option and SAR, the exercise price of each option and SAR and the conditions and limitations applicable to the exercise of each option and SAR. The exercise price of a stock option or SAR will not be less than 100% of the fair market value of the underlying share on the grant date (or 110% in the case of ISOs granted to certain significant stockholders), except with respect to certain substitute awards granted in connection with a corporate transaction. The term of a stock option or SAR may not be longer than ten years (or five years in the case of ISOs granted to certain significant stockholders).
- Restricted Stock and RSUs. Restricted stock is an award of nontransferable shares of our common stock that remain forfeitable unless and until specified conditions are met and which may be subject to a purchase price. RSUs are contractual promises to deliver shares of our common stock in the future, which may also remain forfeitable unless and until specified conditions are met and may be accompanied by the right to receive the equivalent value of dividends paid on shares of our common stock prior to the delivery of the underlying shares. The plan administrator may provide that the delivery of the shares underlying RSUs will be deferred on a mandatory basis or at the election of the participant. The terms and conditions applicable to

restricted stock and RSUs will be determined by the plan administrator, subject to the conditions and limitations contained in our 2019 Plan.

- Other Stock or Cash Based Awards. Other stock or cash based awards are awards of cash, fully vested shares of our common stock and other awards valued wholly or partially by referring to, or otherwise based on, shares of our common stock or other property. Other stock or cash based awards may be granted to participants and may also be available as a payment form in the settlement of other awards, as standalone payments and as payment in lieu of compensation to which a participant is otherwise entitled. The plan administrator will determine the terms and conditions of other stock or cash based awards, which may include any purchase price, performance goal, transfer restrictions and vesting conditions.

Performance criteria

The plan administrator may select performance criteria for an award to establish performance goals for a performance period. Performance criteria under our 2019 Plan may include, but are not limited to, the following: net earnings or losses (either before or after one or more of interest, taxes, depreciation, amortization, and non-cash equity-based compensation expense); gross or net sales or revenue or sales or revenue growth; net income (either before or after taxes) or adjusted net income; profits (including but not limited to gross profits, net profits, profit growth, net operation profit or economic profit), profit return ratios or operating margin; budget or operating earnings (either before or after taxes or before or after allocation of corporate overhead and bonus); cash flow (including operating cash flow and free cash flow or cash flow return on capital); return on assets; return on capital or invested capital; cost of capital; return on stockholders' equity; total stockholder return; return on sales; costs, reductions in costs and cost control measures; expenses; working capital; earnings or loss per share; adjusted earnings or loss per share; price per share or dividends per share (or appreciation in or maintenance of such price or dividends); regulatory achievements or compliance; implementation, completion or attainment of objectives relating to research, development, regulatory, commercial, or strategic milestones or developments; market share; economic value or economic value added models; division, group or corporate financial goals; customer satisfaction/growth; customer service; employee satisfaction; recruitment and maintenance of personnel; human resources management; supervision of litigation and other legal matters; strategic partnerships and transactions; financial ratios (including those measuring liquidity, activity, profitability or leverage); debt levels or reductions; sales-related goals; financing and other capital raising transactions; cash on hand; acquisition activity; investment sourcing activity; and marketing initiatives, any of which may be measured in absolute terms or as compared to any incremental increase or decrease. Such performance goals also may be based solely by reference to the company's performance or the performance of a subsidiary, division, business segment or business unit of the company or a subsidiary, or based upon performance relative to performance of other companies or upon comparisons of any of the indicators of performance relative to performance of other companies. When determining performance goals, the plan administrator may provide for exclusion of the impact of an event or occurrence which the plan administrator determines should appropriately be excluded, including, without limitation, non-recurring charges or events, acquisitions or divestitures, changes in the corporate or capital structure, events unrelated to the business or outside of the control of management, foreign exchange considerations, and legal, regulatory, tax or accounting changes.

Certain transactions

In connection with certain corporate transactions and events affecting our common stock, including a change in control, or change in any applicable laws or accounting principles, the plan administrator has broad discretion to take action under our 2019 Plan to prevent the dilution or enlargement of intended benefits, facilitate the transaction or event or give effect to the change in applicable laws or accounting principles. This includes

canceling awards for cash or property, accelerating the vesting of awards, providing for the assumption or substitution of awards by a successor entity, adjusting the number and type of shares subject to outstanding awards and/or with respect to which awards may be granted under our 2019 Plan and replacing or terminating awards under our 2019 Plan. In addition, in the event of certain non-reciprocal transactions with our stockholders, the plan administrator will make equitable adjustments to our 2019 Plan and outstanding awards as it deems appropriate to reflect the transaction.

Plan amendment and termination

Our board of directors may amend or terminate our 2019 Plan at any time; however, no amendment, other than an amendment that increases the number of shares available under our 2019 Plan, may materially and adversely affect an award outstanding under our 2019 Plan without the consent of the affected participant, and stockholder approval will be obtained for any amendment to the extent necessary to comply with applicable laws. Further, the plan administrator cannot, without the approval of our stockholders, amend any outstanding stock option or SAR to reduce its price per share. Our 2019 Plan will remain in effect until the tenth anniversary of its effective date, unless earlier terminated by our board of directors. No awards may be granted under our 2019 Plan after its termination.

Foreign participants, claw-back provisions, transferability and participant payments

The plan administrator may modify awards granted to participants who are foreign nationals or employed outside the United States or establish subplans or procedures to address differences in laws, rules, regulations or customs of such foreign jurisdictions. All awards will be subject to any company claw-back policy as set forth in such claw-back policy or the applicable award agreement. Except as the plan administrator may determine or provide in an award agreement, awards under our 2019 Plan are generally non-transferrable, except by will or the laws of descent and distribution, or, subject to the plan administrator's consent, pursuant to a domestic relations order, and are generally exercisable only by the participant. With regard to tax withholding obligations arising in connection with awards under our 2019 Plan, and exercise price obligations arising in connection with the exercise of stock options under our 2019 Plan, the plan administrator may, in its discretion, accept cash, wire transfer or check, shares of our common stock that meet specified conditions, a promissory note, a "market sell order," such other consideration as the plan administrator deems suitable or any combination of the foregoing.

2015 Stock incentive plan

Our board of directors and stockholders have approved our 2015 Plan, under which we may grant stock options, restricted stock, RSUs and other stock-based awards to employees, officers, directors, consultants, advisors, advisory board members and other service providers. A total of 8,211,980 shares of our common stock have been authorized for issuance under our 2015 Plan. As of the date of this prospectus, awards of 6,543,084 stock options are outstanding under our 2015 Plan.

Following the effectiveness of our 2019 Plan, we will not make any further grants under our 2015 Plan. However, our 2015 Plan will continue to govern the terms and conditions of the outstanding awards granted under it. Shares of our common stock subject to awards granted under our 2015 Plan that are forfeited, lapse unexercised or are settled in cash and which following the effective date of our 2019 Plan are not issued under our 2015 Plan will be available for issuance under our 2019 Plan.

Administration

Our 2015 Plan is administered by our board of directors, which may delegate its duties and responsibilities to one or more committees of our directors (referred to collectively as our board of directors below) to the extent

permitted by applicable law. Our board of directors has the authority to grant awards under our 2015 Plan and to adopt, amend, and repeal such administrative rules, guidelines, and practices relating to our 2015 Plan as it shall deem advisable. Our board of directors may correct any defect, supply any omission, or reconcile any inconsistency in our 2015 Plan or any award thereunder in the manner and to the extent it deems expedient to carry our 2015 Plan into effect.

Types of awards

Our 2015 Plan provides for the grant of stock options, including NSOs and ISOs, restricted stock, RSUs and other stock-based awards to employees, officers, directors, consultants, advisors, advisory board members or other service providers, except that stock options intended to qualify as ISOs under the Code may only be granted to employees.

Certain adjustments

In the event of certain changes in capitalization, or any dividend or distribution to holders of our common stock other than an ordinary cash dividend, the number and class of securities available under our 2015 Plan and the number and class of securities and exercise price per share of each outstanding option will be equitably adjusted by us (or substituted awards may be made, if applicable) in the manner determined by our board of directors.

Change in control

Unless otherwise specifically provided in an award agreement, our board of directors may take any one or more of the following actions as to all (or any portion of) outstanding options on such terms as our board of directors determines in connection with a change in control, as defined in our 2015 Plan: (1) provide for the assumption or substitution of the award; (2) upon written notice to a participant, provide for the termination of all unexercised options unless exercised within a specific period; (3) provide that outstanding options will become exercisable prior to or upon such change in control; (4) in the event of a change in control in which holders of our common stock will receive cash payment for shares surrendered, make or provide for a cash payment to participants based on the excess, if any of (a) the change in control consideration times the number of shares subject to outstanding options less (b) the aggregate exercise price of the outstanding options, in exchange for termination of such options; (5) provide that, in connection with our liquidation or dissolution, awards shall convert into the right to receive liquidation proceeds (if applicable, net of the exercise price thereof); or (c) any combination of the foregoing.

Plan amendment and termination

Our board of directors may amend, suspend or terminate our 2015 Plan at any time; provided, however, that if at any time the approval of our stockholders is required as to any modification or amendment under Section 422 of the Code or any successor provision with respect to ISOs, our board may not effect such modification or amendment without such approval. Unless otherwise specified in the amendment, any amendment to our 2015 Plan will apply to, and be binding on the holders of, all awards outstanding under our 2015 Plan at the time the amendment is adopted, provided our board determines that such amendment does not materially and adversely affect the rights of participants under our 2015 Plan. Our 2015 Plan will remain in effect until the tenth anniversary of its effective date, unless earlier terminated by our board of directors. No awards may be granted under our 2015 Plan after its termination.

Transferability of awards

Except as our board may otherwise expressly determine or provide in an award, awards under our 2015 Plan may not be sold, assigned, transferred, pledged or otherwise encumbered by the person to whom they are granted, either voluntarily or by operation of law, except by will or the laws of descent and distribution or, other than in the case of an ISO, pursuant to a qualified domestic relations order, and, during the life of the participant, shall be exercisable only by the participant.

2006 Stock incentive plan

Our board of directors previously adopted and our stockholders approved our 2006 Plan in May 2006. Our 2006 Plan expired in accordance with its terms in May 2016 and no further stock awards may be granted under our 2006 Plan. Any awards granted under our 2006 Plan remain subject to the terms of our 2006 Plan and applicable award agreements, until such outstanding awards that are stock options are exercised, or until they terminate or expire by their terms.

Administration

Our 2006 Plan is administered by our board of directors, which may delegate its duties and responsibilities to one or more committees of our directors (referred to collectively as our board of directors below) to the extent permitted by applicable law. Prior to the expiration of our 2006 plan, our board of directors had the authority to grant awards under our 2006 Plan, and our board of directors has the authority to adopt, amend, and repeal such administrative rules, guidelines, and practices relating to our 2006 Plan as it shall deem advisable. Our board of directors may correct any defect, supply any omission, or reconcile any inconsistency in our 2006 Plan or any award thereunder in the manner and to the extent it deems expedient to carry our 2006 Plan into effect.

Types of awards

Our 2006 Plan provided for the grant of stock options, including NSOs and ISOs, restricted stock, RSUs and other stock-based awards to employees, officers, directors, consultants and advisors, except that stock options intended to qualify as ISOs under the Code were only permitted to be granted to employees. As of the date of this prospectus, 1,397,203 awards of stock options are outstanding under our 2006 Plan.

Certain adjustments

In the event of certain changes in capitalization, or any dividend or distribution to holders of our common stock other than an ordinary cash dividend, the number and class of securities available under our 2006 Plan and the number and class of securities and exercise price per share of each outstanding option will be equitably adjusted by us (or substituted awards may be made, if applicable) in the manner determined by our board of directors.

Reorganization

Our board of directors may take any one or more of the following actions as to all (or any portion of) outstanding awards on such terms as our board of directors determines in connection with a reorganization, as defined in our 2006 Plan: (1) provide for the assumption or substitution of the award, (2) upon written notice to a participant, provide for the termination of all unexercised options unless exercised within a specific period, (3) provide that outstanding options will become exercisable prior to or upon such reorganization, (4) in the event of a reorganization in which holders of our common stock will receive cash payment for shares

surrendered, make or provide for a cash payment to participants equal to (a) the reorganization consideration times the number of shares subject to outstanding options minus (b) the aggregate exercise price of the outstanding options, in exchange for termination of such options, (5) provide that, in connection with our liquidation or dissolution, awards shall convert into the right to receive liquidation proceeds (if applicable, net of the exercise price thereof) and (6) any combination of the foregoing.

Transferability of awards

Except as our board may otherwise have expressly determined or provided in an award, awards under our 2006 Plan may not be sold, assigned, transferred, pledged or otherwise encumbered by the person to whom they are granted, either voluntarily or by operation of law, except by will or the laws of descent and distribution or, other than in the case of an ISO, pursuant to a qualified domestic relations order, and, during the life of the participant, shall be exercisable only by the participant.

2019 Employee stock purchase plan

In connection with this offering, we adopted and our stockholders approved our 2019 ESPP to be effective upon the effectiveness of the registration statement of which this prospectus forms a part. The material terms of our 2019 ESPP are summarized below.

Shares available for awards; administration

A total of 525,000 shares of our common stock will initially be reserved for issuance under our 2019 ESPP. In addition, the number of shares available for issuance under our 2019 ESPP will be annually increased on January 1 of each calendar year beginning in 2020 and ending in and including 2029, by an amount equal to the least of (1) 1% of the shares outstanding on the final day of the immediately preceding calendar year and (2) such smaller number of shares as is determined by our board of directors, provided that no more than 5,250,000 shares of our common stock may be issued under our 2019 ESPP. The foregoing numbers are subject to adjustment in certain events, as described below. Our board of directors or a committee of our board of directors will have authority to interpret the terms of our 2019 ESPP and determine eligibility of participants. We expect that the compensation committee will be the initial administrator of our 2019 ESPP.

Eligibility

Our employees are eligible to participate in our 2019 ESPP if they are customarily employed by us or a participating subsidiary for more than twenty hours per week and more than five months in any calendar year. However, an employee may not be granted rights to purchase stock under our 2019 ESPP if the employee, immediately after the grant, would own (directly or through attribution) stock possessing 5% or more of the total combined voting power or value of all classes of our stock.

Grant of rights

Our 2019 ESPP is intended to qualify under Section 423 of the Code and stock will be offered under our 2019 ESPP during offering periods. The length of the offering periods under our 2019 ESPP will be determined by the plan administrator and may be up to twenty-seven months long. Employee payroll deductions will be used to purchase shares on each purchase date during an offering period. The purchase dates for each offering period will be the final trading day in the offering period. Offering periods under our 2019 ESPP will commence when determined by the plan administrator. The plan administrator may, in its discretion, modify the terms of future offering periods.

Our 2019 ESPP permits participants to purchase common stock through payroll deductions of up to 25% of their eligible compensation, which includes a participant's gross base compensation for services to us, including overtime payments and excluding sales commissions, incentive compensation, bonuses, expense reimbursements, fringe benefits and other special payments. The plan administrator will establish a maximum number of shares that may be purchased by a participant during any offering period, which, in the absence of a contrary designation, will be 25,000 shares. In addition, no employee will be permitted to accrue the right to purchase stock under our 2019 ESPP at a rate in excess of $25,000 worth of shares during any calendar year during which such a purchase right is outstanding (based on the fair market value per share of our common stock as of the first day of the offering period).

On the first trading day of each offering period, each participant will automatically be granted an option to purchase shares of our common stock. The option will expire at the end of the applicable offering period, and will be exercised at that time to the extent of the payroll deductions accumulated during the offering period. The purchase price of the shares, in the absence of a contrary designation, will be 85% of the lower of the fair market value of our common stock on the first trading day of the offering period or on the purchase date. Participants may voluntarily end their participation in our 2019 ESPP at any time at least one week prior to the end of the applicable offering period, and will be paid their accrued payroll deductions that have not yet been used to purchase shares of common stock. Participation ends automatically upon a participant's termination of employment.

A participant may not transfer rights granted under our 2019 ESPP other than by will or the laws of descent and distribution.

Certain transactions

In the event of certain non-reciprocal transactions or events affecting our common stock known as "equity restructurings," the plan administrator will make equitable adjustments to our 2019 ESPP and outstanding rights. In the event of certain unusual or non-recurring events or transactions, including a change in control, the plan administrator may provide for (1) either the replacement of outstanding rights with other rights or property or termination of outstanding rights in exchange for cash, (2) the assumption or substitution of outstanding rights by the successor or survivor corporation or parent or subsidiary thereof, if any, (3) the adjustment in the number and type of shares of stock subject to outstanding rights, (4) the use of participants' accumulated payroll deductions to purchase stock on a new purchase date prior to the next scheduled purchase date and termination of any rights under ongoing offering periods or (5) the termination of all outstanding rights.

Plan amendment

The plan administrator may amend, suspend or terminate our 2019 ESPP at any time. However, stockholder approval will be obtained for any amendment that increases the aggregate number or changes the type of shares that may be sold pursuant to rights under our 2019 ESPP, changes the corporations or classes of corporations whose employees are eligible to participate in our 2019 ESPP or changes our 2019 ESPP in any manner that would cause our 2019 ESPP to no longer be an employee stock purchase plan within the meaning of Section 423(b) of the Code.

Director compensation

2018 director compensation

Except as described below, we only provide compensation to our non-employee directors who are not designated by holders of our preferred stock. In 2018, our only such director was Ms. Sharp. In connection with

her appointment in December 2018, our board of directors determined that Ms. Sharp would receive annual cash compensation in an amount equal to $35,000 until such time as our board of directors adopted a non-employee director compensation policy and that she would receive an award of stock options to purchase up to 147,562 shares of our common stock pursuant to the 2015 Plan in connection with her appointment. Ms. Sharp's award vests as to 34% of the underlying shares on the first anniversary of the date of grant and in equal installments at the end of each three-month period over the following 24 months.

The following table provides information related to the 2018 compensation of Ms. Sharp, who was the only director who received compensation from us during 2018.

Name	Fees earned or paid in cash	Option awards(1)	Total
Shalini Sharp	$ 8,750	$1,212,086	$1,220,836

(1) Amount reflects the grant date Black-Scholes value of option awards granted during 2018, computed in accordance with ASC Topic 718 as further described in Note 7 to our audited consolidated financial statements included elsewhere in this prospectus. As of December 31, 2018, 147,562 shares of our common stock were subject to this award. Award vests as to 34% of the underlying shares on December 5, 2019 and in equal installments at the end of each three-month period over the following 24 months.

IPO grants to non-employee directors under the 2019 Plan

Effective upon the pricing of this offering, we will grant to Dr. Schinazi an option under the 2019 Plan to purchase a number of shares of our common stock having an aggregate value on the grant date of $350,000 (as determined using the Black-Scholes option pricing model and using as inputs into such model the initial public offering price per share of our common stock and such other assumptions used to calculate the value of the option awards as described in Note 7 to our consolidated financial statements included elsewhere in this prospectus), at an exercise price per share equal to the initial public offering price per share of our common stock sold in this offering. The option will vest as to 34% of the underlying shares on the first anniversary of the grant date and as to 8.25% of the underlying shares at the end of each three month period thereafter, subject to Mr. Schinazi's continued service through each applicable vesting date.

Non-employee director compensation policy

Effective upon the effectiveness of the registration statement of which this prospectus forms a part, in connection with this offering, we adopted and our stockholders approved a compensation program for our non-employee directors under which each non-employee director will receive the following amounts for their services on our board of directors:

- Upon the director's initial election or appointment to our board of directors that occurs after our initial public offering, an option to purchase shares of our common stock having an aggregate fair value of $350,000 (as determined under the policy);
- If the director has served on our board of directors for at least six months as of the date of an annual meeting of stockholders and will continue to serve as a director immediately following such meeting, an option to purchase shares of our common stock on the date of the annual meeting having an aggregate fair value of $175,000 (as determined under the policy);
- An annual director fee of $40,000;
- If the director serves on a committee of our board of directors, an additional annual fee as follows:
    - Chairman of the audit committee: $15,000

- Audit committee member other than the chairman, $7,500;
- Chairman of the compensation committee, $12,250;
- Compensation committee member other than the chairman, $6,000;
- Chairman of the nominating and corporate governance committee, $8,250; and
- Nominating and corporate governance committee member other than the chairman, $4,500.

Director fees under the program will be payable in arrears in four equal quarterly installments not later than the fifteenth day following the final day of each calendar quarter, provided that the amount of each payment will be prorated for any portion of a quarter that a director is not serving on our board and no fee will be payable in respect of any period prior to the effective date of the registration statement of which this prospectus is a part.

Stock options granted to our non-employee directors under the program will have an exercise price equal to the fair market value of our common stock on the date of grant and will expire not later than ten years after the date of grant. The stock options granted upon a director's initial election or appointment will vest in thirty-six substantially equal monthly installments following the date of grant. The stock options granted annually to directors will vest in a single installment on the earlier of the day before the next annual meeting or the first anniversary of the date of grant. In addition, all unvested stock options will vest in full upon the occurrence of a change in control.

Certain relationships and related party transactions

The following includes a summary of transactions since January 1, 2016, to which we have been a party in which the amount involved exceeded or will exceed $120,000, and in which any of our directors or executive officers or, to our knowledge, beneficial owners of more than 5% of our capital stock or any member of the immediate family of any of the foregoing persons had or will have a direct or indirect material interest, other than equity and other compensation, termination, change in control and other arrangements, which are described under "Executive compensation." We also describe below certain other transactions with our directors, executive officers and stockholders.

Series B preferred stock financing

From May 2018 to July 2018, we issued and sold to investors in a private placement 21,956,095 shares of our Series B preferred stock at a price per share of $5.01, for aggregate gross proceeds of approximately $110.0 million.

The following table summarizes the Series B preferred stock purchased by directors, executive officers, beneficial owners of more than 5% of our capital stock or any member of the immediate family of any of the foregoing persons.

Participants	Series B preferred stock	Total purchase price
5% or greater stockholders and directors		
Amgen Investments Ltd.(1)	499,002	$ 2,500,000
F-Prime Capital Partners Healthcare Fund IV LP(2)	873,253	$ 4,374,997
RA Capital Healthcare Fund, L.P.	399,202	$ 2,000,002
venBio Global Strategic Fund, L.P.(3)	998,004	$ 5,500,000
Tony Yao(4)	9,500	$ 47,595
RFS Partners, LP(5)	119,761	$ 600,003

(1) Series B preferred stock was purchased by Amgen Ventures LLC, an affiliate of Amgen Investment Ltd.

(2) Ben Auspitz, a former member of our board of directors, is a partner at F-Prime Capital Partners. Mr. Auspitz does not hold voting or dispositive power over the shares held by F-Prime Capital Partners Healthcare Fund IV LP. See "Principal stockholders" below for more information.

(3) Robert Adelman, M.D., a member of our board of directors, is a partner at venBio Global Strategic Fund, L.P. See "Principal stockholders" below for more information.

(4) Tony Yao, M.D., Ph.D. is a current member of our board of directors. Dr. Yao is associated with the ArrowMark Funds (as defined below). See "Principal stockholders" below for more information.

(5) Raymond Schinazi, Ph.D. is a current member of our board of directors. Dr. Schinazi is associated with RFS Partners, LP. See "Principal stockholders" below for more information.

Convertible note financing

In March 2019, we sold and issued approximately $39.6 million aggregate principal amount of convertible promissory notes, or the 2019 Notes, in a private placement transaction. ArrowMark Fundamental Opportunity Fund, L.P. purchased $0.6 million of 2019 Notes, and ArrowMark Life Science Fund, L.P. purchased $0.5 million of 2019 Notes. Tony Yao, M.D., Ph.D. is a current member of our board of directors and is associated with the Arrowmark Funds (as defined below). RFS Partners, LP purchased $0.5 million of 2019 Notes. Raymond Schinazi, Ph.D. is a current member of our board of directors and is associated with RFS Partners, LP. See "Principal stockholders" below for more information.

Immediately prior to the completion of this offering, the 2019 Notes will be converted into a number of shares of common stock determined at a settlement price equal to the lesser of (i) 85% of the price per share of the

shares offered hereby or (ii) a price per share equal to $800.0 million divided by our fully diluted capitalization as of immediately prior to the closing of this offering.

The following table sets forth the number of shares the 2019 Notes will convert into and the number of shares of common stock that would be outstanding immediately after the conversion of the 2019 Notes and the conversion of our convertible preferred stock, but before this offering, assuming the initial public offering prices as set forth below:

	$14.00	$15.00	$16.00	$17.00	$18.00	$19.00
Shares issuable upon automatic settlement of 2019 Notes	3,339,912	3,117,248	2,922,424	2,750,511	2,597,702	2,519,890
Shares Outstanding	41,547,747	41,325,083	41,130,259	40,958,346	40,805,537	40,727,725

Investors' rights agreement

We are party to an amended and restated investors' rights agreement, which we refer to as our investors' rights agreement, with each holder of our convertible preferred stock and 2019 Notes and certain holders of our common stock (Derek Jantz, Matthew Kane and Jeff Smith), which includes each holder of more than 5% of our capital stock and each of our directors (or, in some cases, entities affiliated therewith). Our investors' rights agreement imposes certain affirmative obligations on us and also grants certain rights to the holders, including certain registration rights with respect to the registrable securities held by them that will survive this offering. See "Description of capital stock—Registration rights" for additional information. This right of first offer does not apply to this offering and will terminate by its terms in connection with the closing of this offering.

Voting agreement

We are a party to an amended and restated voting agreement with certain of our stockholders, pursuant to which each of our directors was elected to serve as members on our board of directors and, as of the date of this prospectus, continue to so serve. Our voting agreement will terminate by its terms in connection with the closing of this offering, and members previously elected to our board of directors pursuant to this voting agreement will continue to serve as directors until they resign, are removed or their successors are duly elected by the holders of our common stock. The composition of our board of directors after this offering is described in more detail under "Management—Board composition and election of directors."

Right of first refusal and co-sale agreement

We are party to an amended and restated right of first refusal and co-sale agreement with each holder of our convertible preferred stock and certain holders of our common stock (Derek Jantz, Matthew Kane and Jeff Smith), which includes each holder of more than 5% of our capital stock and certain of our directors (or, in some cases, entities affiliated therewith), pursuant to which we have a right of first refusal in respect of certain sales of securities by Drs. Jantz and Smith and Mr. Kane. To the extent we do not exercise such right in full, the holders of our convertible preferred stock are granted certain rights of first refusal and co-sale in respect of such sale. The right of first refusal and co-sale agreement will terminate by its terms in connection with the closing of this offering.

Director and officer indemnification and insurance

We have agreed to indemnify each of our directors and executive officers against certain liabilities, costs and expenses and have purchased directors' and officers' liability insurance. See "Description of capital stock—Limitations on liability and indemnification matters."

Employment agreements

We have entered into employment agreements with our certain of our executive officers, including our named executive officers. For more information regarding the agreements with our named executive officers, see "Executive compensation—Employment agreements."

Stock option grants to executive officers and directors

We have granted stock options to our executive officers as more fully described in "Executive compensation."

Other transactions

In April 2017, in connection with a repurchase program approved by our board of directors, we repurchased 600,662 shares of common stock from J. Christopher Rhodes, a beneficial owner of more than 5% of our common stock, for aggregate proceeds of approximately $0.7 million.

Chelsea Lynam, Mr. Kane's wife, serves as our Manager, Facilities Planning & Design. Ms. Lynam received total compensation of $273,375 in 2018 in respect of base salary, bonus and the grant date fair value of options to purchase 28,106 shares of our common stock that were granted in 2018. Ms. Lynam also participates in other employee benefit plans and arrangements that are made generally available to other employees.

Policies and procedures for related person transactions

Our board of directors has adopted a written related person transaction policy, to be effective upon the closing of this offering, setting forth the policies and procedures for the review and approval or ratification of related person transactions. This policy will cover, with certain exceptions set forth in Item 404 of Regulation S-K under the Securities Act, any transaction, arrangement or relationship, or any series of similar transactions, arrangements or relationships, in which we were or are to be a participant, where the amount involved exceeds $120,000 in any fiscal year and a related person had, has or will have a direct or indirect material interest, including, without limitation, purchases of goods or services by or from the related person or entities in which the related person has a material interest as well as indebtedness, guarantees of indebtedness and our employment of a related person. In reviewing and approving any such transactions, our audit committee is tasked to consider all relevant facts and circumstances, including, but not limited to, whether the transaction is on terms comparable to those that could be obtained in an arm's length transaction and the extent of the related person's interest in the transaction. All of the transactions described in this section occurred prior to the effectiveness of this policy.

Principal stockholders

The following table sets forth information with respect to the beneficial ownership of our common stock as of December 31, 2018 by:

- each person or group of affiliated persons known by us to beneficially own more than 5% of our common stock;
- each of our named executive officers;
- each of our directors; and
- all of our executive officers and directors as a group.

The percentage ownership information under the column entitled “Before offering” is based on 38,207,835 shares of common stock outstanding as of December 31, 2018, assuming conversion of all outstanding shares of our convertible preferred stock into 22,301,190 shares of common stock upon the closing of this offering. The percentage ownership information under the column entitled “After offering” is based on (1) the sale of 7,900,000 shares of common stock in this offering and (2) the automatic settlement of the 2019 Notes, including accrued interest, into an aggregate of 2,922,424 shares of our common stock, assuming an initial public offering price of $16.00 per share, which is the midpoint of the price range set forth on the cover page of this prospectus, in connection with the closing of this offering. The following table does not reflect any potential purchases in this offering, which purchases, if any, will increase the percentage of shares owned by certain of our directors and executive officers after this offering.

The number of shares beneficially owned by each individual or entity listed in the table below is determined under rules promulgated by the SEC. Under these rules, beneficial ownership includes any shares as to which the individual or entity has sole or shared voting power or investment power. In computing the number of shares beneficially owned by an individual or entity and the percentage ownership of such person, shares of common stock subject to options or other rights held by such person that are currently exercisable or will become exercisable within 60 days of December 31, 2018 are considered outstanding, although these shares are not considered outstanding for purposes of computing the percentage ownership of any other person. Unless otherwise noted, the address of all listed individuals or entities is c/o Precision BioSciences, 302 East Pettigrew St., Suite A-100, Durham, North Carolina 27701. Each of individual and entity listed has sole voting and investment power with respect to the shares beneficially owned by such person unless otherwise noted, subject to community property laws where applicable.

		Percentage of shares beneficially owned	
Name of beneficial owner	**Number of shares beneficially owned**	**Before offering**	**After offering**
5% or Greater Stockholders			
venBio Global Strategic Fund, L.P.(1)	4,215,141	11.0%	8.6%
Jeff Smith, Ph.D.(2)	4,178,128	10.8%	8.5%
F-Prime Capital Partners Healthcare Fund IV LP(3)	3,688,248	9.7%	7.5%
Named Executive Officers and Directors			
Matthew Kane(4)	2,150,625	5.6%	4.4%
Abid Ansari (5)	93,982	*	*
David Thomson, Ph.D.(6)	166,183	*	*
Robert Adelman, M.D.(1)	4,215,141	11.0%	8.6%
Derek Jantz, Ph.D.(7)	4,178,128	10.8%	8.5%

Name of beneficial owner	Number of shares beneficially owned	Percentage of shares beneficially owned: Before offering	Percentage of shares beneficially owned: After offering
Raymond F. Schinazi, Ph.D.(8)	56,102	*	*
Shalini Sharp	—	—	
Tony Yao, M.D., Ph.D.(9)	935,031	2.4%	2.7%
All executive officers and directors as a group (9 persons)(10)	11,866,923	30.7%	25.0%

* Less than 1%.

(1) Consists of 4,215,141 shares of common stock issuable upon conversion of 8,000,000 shares of Series A convertible preferred stock and 998,004 shares of Series B preferred stock. VenBio Global Strategic GP, L.P., or venBio GP, is the sole general partner of venBio Global Strategic Fund, L.P., or venBio, and venBio Global Strategic GP, Ltd., or venBio GP Ltd., is the sole general partner of venBio GP. Robert Adelman, one of our directors, and Corey Goodman are directors of venBio GP Ltd. and share voting and dispositive control over the shares held by venBio. The mailing address of venBio Global Strategic Fund, L.P. is c/o venBio Partners, LLC, 1700 Owens Street, Suite 595, San Francisco, CA 94158.

(2) Consists of (a) 3,845,170 shares of common stock and (b) 332,958 shares of common stock underlying options exercisable within 60 days of December 31, 2018.

(3) Consists of 3,688,248 shares of common stock issuable upon conversion of 7,000,000 shares of Series A convertible preferred stock and 873,253 shares of Series B preferred stock. The general partner of F-Prime Capital Partners Healthcare Fund IV LP is F-Prime Capital Partners Healthcare Advisors Fund IV LP. F-Prime Capital Partners Healthcare Advisors Fund IV LP is solely managed by Impresa Management LLC, the managing member of its general partner and investment manager. Impresa Management LLC is owned, directly or indirectly, by various shareholders and employees of FMR LLC. Each of the entities listed above expressly disclaims beneficial ownership of the securities listed above except to the extent of any pecuniary interest therein. The mailing address of F-Prime Capital Partners Healthcare Fund IV LP is 245 Summer Street, Boston, MA 02210.

(4) Consists of (a) 1,802,427 shares of common stock held directly by Mr. Kane, (b) 8,067 shares of common stock held by Chelsea Lynam, Mr. Kane's wife, (c) 332,958 shares of common stock underlying options held by Mr. Kane exercisable within 60 days of December 31, 2018 and (d) 7,173 shares of common stock underlying options held by Ms. Lynam exercisable within 60 days of December 31, 2018.

(5) Consists of 93,982 shares of common stock underlying options exercisable within 60 days of December 31, 2018.

(6) Consists of 166,183 shares of common stock underlying options exercisable within 60 days of December 31, 2018.

(7) Consists of (a) 3,845,170 shares of common stock and (b) 332,958 shares of common stock underlying options exercisable within 60 days of December 31, 2018.

(8) Consists of 56,102 shares of common stock issuable upon conversion of 119,761 shares of Series B convertible preferred stock held by RFS Partners, LP, or RFS. RFS & Associates, LLC, or RFS & Associates, is the general partner of RFS and Dr. Schinazi is a limited partner of RFS as well as the manager of RFS & Associates. Dr. Schinazi may be considered the beneficial owner of the shares held by RFS and disclaims beneficial ownership of such shares, except to the extent of any pecuniary interest therein. In addition, the percentage of shares beneficially owned by Dr. Schinazi after the offering includes 36,946 shares of common stock issuable upon conversion of a convertible promissory note held by RFS. The principal business address of RFS is 1860 Montreal Road, Tucker, GA 30084.

(9) Consists of (a) 4,450 shares of common stock issuable upon conversion of 9,500 shares of Series B convertible preferred stock held directly by Dr. Yao, (b) 93,690 shares of common stock issuable upon conversion of 200,000 shares of Series B convertible preferred stock held by ArrowMark Fundamental Opportunity Fund, L.P., (c) 114,570 shares of common stock issuable upon conversion of 244,572 shares of Series B convertible preferred stock held by ArrowMark Life Science Fund, (d) 4,684 shares of common stock issuable upon conversion of 10,000 shares of Series B convertible preferred stock held by CF Ascent LLC, (e) 70,010 shares of common stock issuable upon conversion of 149,451 shares of Series B convertible preferred stock held by Iron Horse Investments, LLC, or Iron Horse, (f) 18,700 shares of common stock issuable upon conversion of 39,920 shares of Series B convertible preferred stock held by Lookfar Investments, LLC, (g) 292,670 shares of common stock issuable upon conversion of 624,759 shares of Series B convertible preferred stock held by Meridian Growth Fund, or Meridian Growth, (h) 261,797 shares of common stock issuable upon conversion of 558,855 shares of Series B convertible preferred stock held by Meridian Small Cap Growth Fund, or Meridian Small Cap, (i) 70,010 shares of common stock issuable upon conversion of 149,451 shares of Series B convertible preferred stock held by THB Iron Rose, LLC, or THB Iron Rose, and (j) 4,450 shares of common stock issuable upon conversion of 9,500 shares of Series B convertible preferred stock held by THB Iron Rose, LLC Life Science Portfolio, or THB Iron Rose Life Science, which are referred to collectively as the ArrowMark Funds. ArrowMark Colorado Holdings LLC, or ArrowMark Colorado, is investment advisor to ArrowMark Funds. Dr. Yao, one of our directors, is employed as a portfolio manager for ArrowMark Colorado and has direct voting and dispositive control over the shares held by ArrowMark Life Science Fund and THB Iron Rose Life Science. Dr. Yao may be considered the beneficial owner of the shares held by ArrowMark Life Science Fund and THB Iron Rose Life Science and disclaims beneficial ownership of such shares, except to the extent of any pecuniary interest therein. In addition, the percentage of shares beneficially owned by Dr. Yao after the offering includes 369,459 shares of common stock issuable upon conversion of convertible promissory notes held by certain of the ArrowMark Funds. The principal business address of the ArrowMark Funds is 100 Fillmore Street, Suite 325, Denver, Colorado 80206.

(10) Consists of (a) 5,655,664 shares of common stock, (b) 1,004,985 shares of common stock underlying options exercisable within 60 days of December 31, 2018, and (c) 5,206,273 shares of common stock issuable upon conversion of 8,000,000 shares of Series A convertible preferred stock and 3,113,773 of Series B convertible preferred stock. In addition, the percentage of shares beneficially owned after the offering includes 406,405 shares of common stock issuable upon conversion of convertible promissory notes held by RFS and certain ArrowMark Funds.

Description of capital stock

Capital structure

The following description of our capital stock and certain provisions of our amended and restated certificate of incorporation and amended and restated bylaws are summaries and are qualified by reference to the amended and restated certificate of incorporation and the amended and restated bylaws that will go into effect upon the closing of this offering. Copies of these documents will be filed with the SEC as exhibits to our registration statement, of which this prospectus forms a part. The descriptions of our common stock and preferred stock reflect changes to our capital structure that will occur upon the closing of this offering.

General

Upon the completion of this offering, our authorized capital stock will consist of 200,000,000 shares of common stock, par value $0.000005 per share, and 10,000,000 shares of preferred stock, par value $0.0001 per share, all of which will be undesignated.

Common stock

As of December 31, 2018, assuming the conversion of all outstanding shares of our convertible preferred stock into 22,301,190 shares of our common stock upon the closing of this offering, we had outstanding 38,207,835 shares of common stock held of record by 119 stockholders. Additionally, in connection with the closing of this offering, the 2019 Notes, including accrued interest, will automatically settle into 2,922,424 shares of our common stock, assuming an initial public offering price per share of $16.00, which is the midpoint of the price range set forth on the cover page of this prospectus.

Holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of stockholders and do not have cumulative voting rights. An election of directors by our stockholders shall be determined by a plurality of the votes cast by the stockholders entitled to vote on the election. Holders of common stock are entitled to receive proportionately any dividends as may be declared by our board of directors, subject to any preferential dividend rights of any series of preferred stock that we may designate and issue in the future.

In the event of our liquidation or dissolution, the holders of our common stock are entitled to receive proportionately our net assets available for distribution to stockholders after the payment of all debts and other liabilities and subject to the prior rights of any outstanding preferred stock. Holders of our common stock have no preemptive, subscription, redemption or conversion rights. Our outstanding shares of common stock are, and the shares offered by us in this offering will be, when issued and paid for, validly issued, fully paid and nonassessable. The rights, preferences and privileges of holders of common stock are subject to and may be adversely affected by the rights of the holders of shares of any series of preferred stock that we may designate and issue in the future.

Preferred stock

As of December 31, 2018, there were 22,301,190 shares of our convertible preferred stock outstanding. Upon the closing of this offering, all outstanding shares of our convertible preferred stock will convert into 22,301,190 shares of our common stock.

Under the terms of our amended and restated certificate of incorporation that will go into effect upon the closing of this offering, our board of directors will be authorized to direct us to issue shares of preferred stock

in one or more series without stockholder approval. Our board of directors has the discretion to determine the rights, preferences, privileges and restrictions, including voting rights, dividend rights, conversion rights, redemption privileges and liquidation preferences, of each series of preferred stock.

The purpose of authorizing our board of directors to issue preferred stock and determine its rights and preferences is to eliminate delays associated with a stockholder vote on specific issuances. The issuance of preferred stock, while providing flexibility in connection with possible acquisitions, future financings and other corporate purposes, could have the effect of making it more difficult for a third-party to acquire, or could discourage a third-party from seeking to acquire, a majority of our outstanding voting stock. Upon the closing of this offering, there will be no shares of preferred stock outstanding, and we have no present plans to issue any shares of preferred stock.

Options

As of December 31, 2018, options to purchase 6,366,261 shares of our common stock were outstanding under our 2015 Plan, of which 2,021,741 options were vested as of that date, and options to purchase 1,397,203 shares of our common stock were outstanding under our 2006 Plan, all of which options were vested as of that date.

Registration rights

Our investors' rights agreement grants the parties thereto certain registration rights in respect of the "registrable securities" held by them, which securities include (1) the shares of our common stock issued upon the conversion of shares of our convertible preferred stock, (2) the shares of our common stock issued to certain of our founders, (3) the shares of our common stock issued upon the settlement of the 2019 Notes, and (4) any shares of our common stock issued as a dividend or other distribution with respect to the shares described in the foregoing clauses (1), (2) and (3).

Demand registration rights

Upon the closing of this offering, certain holders of our registrable securities are entitled to demand registration rights. Under the terms of our investors' rights agreement, we will be required, upon the request of holders of at least 60% of our outstanding registrable securities issued or issuable upon conversion of our convertible preferred stock, to file a registration statement with an anticipated offering amount of at least $15.0 million and use our best efforts to effect the registration of these shares for public resale. We are required to effect up to three registrations pursuant to this provision of our investors' rights agreement. A demand for registration may not be made until six months after the effective date of the registration statement for which this prospectus forms a part.

Short form registration rights

Upon the closing of this offering, the holders of our registrable securities are also entitled to short form registration rights. Pursuant to our investors' rights agreement, if we are eligible to file a registration statement on Form S-3, upon the request of holders of at least 25% of our outstanding registrable securities to sell registrable securities with an anticipated aggregate offering amount of at least $1.0 million net of certain expenses related to the offering, we will be required to use our best efforts to effect a registration of such shares. We are required to effect up to two registrations in any 12-month period and no more than one registration in any four-month period pursuant to this provision of our investors' rights agreement.

Piggyback registration rights

The holders of our registrable securities are also entitled to piggyback registration rights. If we register any of our securities either for our own account or for the account of other security holders, the holders of our outstanding registrable securities are entitled to include their shares in the registration (other than a demand registration, a registration in connection with an initial public offering that becomes effective on or before June 30, 2019, or a registration pursuant to a registration statement on Form S-4 or S-8). Subject to certain exceptions contained in our investors' rights agreement, we and the underwriters may limit the number of shares included in an underwritten offering if the underwriters determine that marketing factors require a limitation of the number of shares to be underwritten.

Expenses and indemnification

Ordinarily, other than underwriting discounts and commissions, we will be required to pay all expenses incurred by us related to any registration effected pursuant to the exercise of these registration rights. These expenses may include all registration and filing fees, printing expenses, fees and disbursements of our counsel, reasonable fees and disbursements of a single counsel for the selling security holders and blue sky fees and expenses. Our investors' rights agreement also includes customary indemnification and procedural terms.

Termination of registration rights

The registration rights will expire on the earlier of (1) the date that is five years after the closing of this offering or (2) with respect to each stockholder following the closing of this offering, at such time as such stockholder holds 1% or less of our outstanding common stock and can sell all of its registrable securities without volume limitations pursuant to Rule 144 of the Securities Act during any three-month period.

Anti-takeover provisions

Some provisions of Delaware law and our amended and restated certificate of incorporation and our amended and restated bylaws that will go into effect upon the closing of this offering could make the following transactions more difficult: an acquisition of us by means of a tender offer; an acquisition of us by means of a proxy contest or otherwise; or the removal of our incumbent officers and directors. It is possible that these provisions could make it more difficult to accomplish or could deter transactions that stockholders may otherwise consider to be in their best interests or in our best interests, including transactions that provide for payment of a premium over the market price for our shares.

These provisions, summarized below, are intended to discourage coercive takeover practices and inadequate takeover bids. These provisions are also designed to encourage persons seeking to acquire control of us to first negotiate with our board of directors. We believe that the benefits of the increased protection of our potential ability to negotiate with the proponent of an unfriendly or unsolicited proposal to acquire or restructure us outweigh the disadvantages of discouraging these proposals because negotiation of these proposals could result in an improvement of their terms.

Undesignated preferred stock

The ability of our board of directors, without action by our stockholders, to issue up to 10,000,000 shares of undesignated preferred stock with voting or other rights or preferences as designated by our board of directors could impede the success of any attempt to effect a change in control of our company. These and other provisions may have the effect of deferring hostile takeovers or delaying changes in control or management of our company.

Stockholder meetings

Our amended and restated bylaws will provide that a special meeting of stockholders may be called only by the chairman of our board of directors, our chief executive officer or president (in the absence of a chief executive officer), or by a resolution adopted by a majority of our board of directors.

Requirements for advance notification of stockholder nominations and proposals

Our amended and restated bylaws will establish advance notice procedures with respect to stockholder proposals to be brought before a stockholder meeting and the nomination of candidates for election as directors, other than nominations made by or at the direction of our board of directors or a committee of our board of directors.

Elimination of stockholder action by written consent

Our amended and restated certificate of incorporation will eliminate the right of stockholders to act by written consent without a meeting.

Staggered board

Our board of directors will be divided into three classes. The directors in each class will serve for a three-year term, with one class being elected each year by our stockholders. For more information on our classified board, see “Management—Board composition and election of directors.” This system of electing and removing directors may tend to discourage a third party from making a tender offer or otherwise attempting to obtain control of us, because it generally makes it more difficult for stockholders to replace a majority of the directors.

Removal of directors

Our amended and restated certificate of incorporation will provide that no member of our board of directors may be removed from office by our stockholders except for cause and, in addition to any other vote required by law, upon the approval of the holders of at least two-thirds in voting power of the outstanding shares of stock entitled to vote in the election of directors.

Stockholders not entitled to cumulative voting

Our amended and restated certificate of incorporation will not permit stockholders to cumulate their votes in the election of directors. Accordingly, the holders of a majority of the outstanding shares of our common stock entitled to vote in any election of directors will be able to elect all of the directors standing for election, if they choose, other than any directors that holders of our convertible preferred stock may be entitled to elect.

Choice of forum

Our amended and restated certificate of incorporation will provide that, unless we consent in writing to the selection of an alternative forum to the fullest extent permitted by law, the Court of Chancery of the State of Delaware will be the sole and exclusive forum for (1) any derivative action or proceeding brought on our behalf, (2) any action asserting a claim of breach of a fiduciary duty or other wrongdoing by any of our directors, officers, employees or agents to us or our stockholders, (3) any action asserting a claim against us arising pursuant to any provision of the General Corporation Law of the State of Delaware or our certificate of incorporation or bylaws, (4) any action to interpret, apply, enforce or determine the validity of our certificate of

incorporation or bylaws, or (5) any action asserting a claim governed by the internal affairs doctrine. Under our amended and restated certificate of incorporation, this exclusive forum provision will not apply to claims which are vested in the exclusive jurisdiction of a court or forum other than the Court of Chancery of the State of Delaware, or for which the Court of Chancery of the State of Delaware does not have subject matter jurisdiction. For instance, the provision would not apply to actions arising under federal securities laws, including suits brought to enforce any liability or duty created by the Exchange Act or the rules and regulations thereunder. This provision would not apply to suits brought to enforce a duty or liability created by the Exchange Act. Our amended and restated certificate of incorporation will also provide that any person or entity holding, purchasing or otherwise acquiring any interest in shares of our capital stock will be deemed to have notice of and to have consented to this choice of forum provision. It is possible that a court of law could rule that the choice of forum provision contained in our amended and restated certificate of incorporation is inapplicable or unenforceable if it is challenged in a proceeding or otherwise.

Amendment of charter provisions

The amendment of any of the above provisions, except for the provision making it possible for our board of directors to issue preferred stock and the provision prohibiting cumulative voting, would require approval by holders of at least two-thirds in voting power of the outstanding shares of stock entitled to vote thereon.

Section 203 of the Delaware General Corporation Law

We are subject to Section 203 of the General Corporation Law of the State of Delaware, which prohibits persons deemed to be “interested stockholders” from engaging in a “business combination” with a publicly held Delaware corporation for three years following the date these persons become interested stockholders unless the business combination is, or the transaction in which the person became an interested stockholder was, approved in a prescribed manner or another prescribed exception applies. Generally, an “interested stockholder” is a person who, together with affiliates and associates, owns, or within three years prior to the determination of interested stockholder status did own, 15% or more of a corporation’s voting stock. Generally, a “business combination” includes a merger, asset or stock sale, or other transaction resulting in a financial benefit to the interested stockholder. The existence of this provision may have an anti-takeover effect with respect to transactions not approved in advance by our board of directors.

Limitations on liability and indemnification matters

Our amended and restated certificate of incorporation, which will go into effect upon the closing of this offering, will limit our directors’ liability to the fullest extent permitted under Delaware law, which prohibits our amended and restated certificate of incorporation from limiting the liability of our directors for the following:

- any breach of the director’s duty of loyalty to us or our stockholders;
- acts or omissions not in good faith or that involve intentional misconduct or a knowing violation of law;
- unlawful payment of dividends or unlawful stock repurchases or redemptions; or
- any transaction from which the director derived an improper personal benefit.

If Delaware law is amended to authorize corporate action further eliminating or limiting the personal liability of a director, then the liability of our directors will be eliminated or limited to the fullest extent permitted by Delaware law, as so amended. This limitation of liability does not apply to liabilities arising under the federal securities laws and does not affect the availability of equitable remedies such as injunctive relief or rescission.

Our amended and restated bylaws, which will go into effect upon the closing of this offering, will provide that we will indemnify our directors and officers to the fullest extent permitted under Delaware law and that we shall have the power to indemnify our employees and agents to the fullest extent permitted by law. Our amended and restated bylaws will also permit us to secure insurance on behalf of any officer, director, employee or other agent for any liability arising out of his or her actions in this capacity, regardless of whether we would have the power to indemnify such person against such expense, liability or loss under the General Corporation Law of the State of Delaware.

We have also entered into separate indemnification agreements with our directors and executive officers, in addition to indemnification provided for in our amended and restated bylaws. These agreements, among other things, provide for indemnification of our directors and executive officers for expenses, judgments, fines and settlement amounts incurred by such persons in any action or proceeding arising out of this person's services as a director or executive officer or at our request. We believe that these provisions in our amended and restated certificate of incorporation and amended and restated bylaws and indemnification agreements are necessary to attract and retain qualified persons as directors and executive officers.

The above description of the limitation of liability and indemnification provisions of our amended and restated certificate of incorporation, our amended and restated bylaws and our indemnification agreements is not complete and is qualified in its entirety by reference to these documents, each of which will be filed as an exhibit to this registration statement to which this prospectus forms a part.

The limitation of liability and indemnification provisions in our amended and restated certificate of incorporation and amended and restated bylaws may discourage stockholders from bringing a lawsuit against our directors for breach of their fiduciary duties. They may also reduce the likelihood of derivative litigation against directors and officers, even though an action, if successful, might benefit us and our stockholders. A stockholder's investment may be harmed to the extent we pay the costs of settlement and damage awards against directors and officers pursuant to these indemnification provisions. Insofar as indemnification for liabilities under the Securities Act may be permitted to directors, officers or persons controlling us pursuant to the foregoing provisions, we have been informed that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable. There is no pending litigation or proceeding naming any of our directors or officers as to which indemnification is being sought, nor are we aware of any pending or threatened litigation that may result in claims for indemnification by any director or officer.

Listing

We have applied to list our common stock on The Nasdaq Global Market under the symbol "DTIL."

Transfer agent and registrar

The transfer agent and registrar for our common stock will be American Stock Transfer & Trust Company, LLC.

Shares eligible for future sale

Immediately prior to this offering, there was no public market for our common stock, and no predictions can be made about the effect, if any, that market sales of our common stock or the availability of such shares for sale will have on the market price prevailing from time to time. Nevertheless, future sales of our common stock in the public market, or the perception that such sales may occur, could adversely affect the market price of our common stock and could impair our ability to raise capital through future sales of our securities. See “Risk factors—Risks related to this offering and owning our common stock—A significant portion of our total outstanding shares is restricted from immediate resale but may be sold into the market in the near future, which could cause the market price of our common stock to decline significantly, even if our business is doing well.” Furthermore, although we have applied to have our common stock listed on the Nasdaq Global Market, we cannot assure you that there will be an active public trading market for our common stock.

Upon the closing of this offering, based on the number of shares of our common stock outstanding as of December 31, 2018 and after giving effect to the automatic conversion of all outstanding shares of our convertible preferred stock into 22,301,190 shares of our common stock upon the closing of this offering and the automatic settlement of the 2019 Notes, including accrued interest, into 2,922,424 shares of our common stock in connection with the closing of this offering, assuming an initial public offering price per share of $16.00, which is the midpoint of the price range set forth on the cover page of this prospectus, and assuming no exercise of options after December 31, 2018, we will have an aggregate of 49,030,259 shares of our common stock outstanding (or 50,215,259 shares of our common stock if the underwriters exercise in full their option to purchase additional shares). Of these shares of our common stock, all of the 7,900,000 shares sold in this offering (or 9,085,000 shares if the underwriters exercise in full their option to purchase additional shares) will be freely tradable without restriction or further registration under the Securities Act, except for any shares purchased by our “affiliates,” as that term is defined in Rule 144 under the Securities Act, whose sales would be subject to the Rule 144 resale restrictions described below, other than the holding period requirement.

The remaining 41,130,259 shares of our common stock, including shares of our common stock issued upon the automatic settlement of the 2019 Notes in connection with the closing of this offering, assuming an initial public offering price per share of $16.00, which is the midpoint of the price range set forth on the cover page of this prospectus, will be “restricted securities,” as that term is defined in Rule 144 under the Securities Act. These restricted securities are eligible for public sale only if they are registered under the Securities Act or if they qualify for an exemption from registration under Rules 144 or 701 under the Securities Act, which are summarized below. We expect that substantially all of these shares will be subject to the 180-day lock-up period under the lock-up agreements described below. Upon expiration of the lock-up period, we estimate that all of these restricted securities will be available for sale in the public market, subject in some cases to applicable volume limitations under Rule 144.

Lock-up agreements

We and each of our directors and executive officers and holders of substantially all of our outstanding capital stock, who will collectively own substantially all of our shares of common stock upon the closing of this offering (after giving effect to the automatic conversion of all outstanding shares of our convertible preferred stock into shares of our common stock upon the closing of this offering and the automatic settlement of the 2019 Notes in connection with the closing of this offering, assuming an initial public offering price per share of $16.00, which is the midpoint of the price range set forth on the cover page of this prospectus), have agreed not to sell or transfer any common stock or securities convertible into, exchangeable for, exercisable for or repayable with common stock, for 180 days after the date of this prospectus without first obtaining the written consent of J.P. Morgan Securities LLC, Goldman Sachs & Co. LLC and Jefferies LLC.

Upon the expiration of the lock-up period, substantially all of the shares subject to such lock-up restrictions will become eligible for sale, subject to the limitations discussed above. For a further description of these lock-up agreements, see “Underwriting.”

Rule 144

Affiliate resales of restricted securities

In general, beginning 90 days after the effective date of the registration statement of which this prospectus is a part, a person who is an affiliate of ours, or who was an affiliate at any time during the 90 days before a sale, who has beneficially owned shares of our common stock for at least six months would be entitled to sell in “broker’s transactions” or certain “riskless principal transactions” or to market makers, a number of shares within any three-month period that does not exceed the greater of:

- 1% of the number of shares of our common stock then outstanding, which will equal approximately 490,000 shares of our common stock immediately after this offering; or
- the average weekly trading volume in shares of our common stock on the Nasdaq Global Market during the four calendar weeks preceding the filing of a notice on Form 144 with respect to such sale.

Affiliate resales under Rule 144 are also subject to the availability of current public information about us. In addition, if the number of shares being sold under Rule 144 by an affiliate during any three-month period exceeds 5,000 shares or has an aggregate sale price in excess of $50,000, the seller must file a notice on Form 144 with the SEC and Nasdaq concurrently with either the placing of a sale order with the broker or the execution directly with a market maker.

Non-affiliate resales of restricted securities

In general, beginning 90 days after the effective date of the registration statement of which this prospectus is a part, a person who is not an affiliate of ours at the time of sale, and has not been an affiliate at any time during the three months preceding a sale, and who has beneficially owned shares of our common stock for at least six months but less than a year, is entitled to sell such shares subject only to the availability of current public information about us. If such person has held our shares for at least one year, such person can resell under Rule 144(b)(1) without regard to any Rule 144 restrictions, including the 90-day public company requirement and the current public information requirement.

Non-affiliate resales are not subject to the manner of sale, volume limitation or notice filing provisions of Rule 144.

Rule 701

In general, under Rule 701, any of an issuer’s employees, directors, officers, consultants or advisors who purchases shares from the issuer in connection with a compensatory stock or option plan or other written agreement before the effective date of a registration statement under the Securities Act is entitled to sell such shares 90 days after such effective date in reliance on Rule 144. An affiliate of the issuer can resell shares in reliance on Rule 144 without having to comply with the holding period requirement, and non-affiliates of the issuer can resell shares in reliance on Rule 144 without having to comply with the current public information and holding period requirements.

The SEC has indicated that Rule 701 will apply to typical options granted by an issuer before it becomes subject to the reporting requirements of the Exchange Act, along with the shares acquired upon exercise of such options, including exercises after an issuer becomes subject to the reporting requirements of the Exchange Act.

Equity plans

We intend to file one or more registration statements on Form S-8 under the Securities Act to register all shares of our common stock subject to outstanding options and shares of our common stock issued or issuable under our incentive plans. We expect to file the registration statement covering shares offered pursuant to our incentive plans shortly after the date of this prospectus, permitting the resale of such shares by non-affiliates in the public market without restriction under the Securities Act and the sale by affiliates in the public market, subject to compliance with the resale provisions of Rule 144.

Registration rights

Upon the closing of this offering, the holders of 35,754,780 shares of our common stock (including shares of our common stock issuable upon the conversion of all outstanding shares of our convertible preferred stock upon the closing of this offering and the automatic settlement of the 2019 Notes, including accrued interest, into 2,922,424 shares of our common stock in connection with the closing of this offering, assuming an initial public offering price per share of $16.00, which is the midpoint of the price range set forth on the cover page of this prospectus) or their transferees will be entitled to various rights with respect to the registration of these shares under the Securities Act. Registration of these shares under the Securities Act would result in these shares becoming fully tradable without restriction under the Securities Act immediately upon the effectiveness of the registration, except for shares purchased by affiliates. See “Description of capital stock—Registration rights” for additional information. Shares covered by a registration statement will be eligible for sale in the public market upon the expiration or release from the terms of any applicable lock-up agreement.

Material U.S. federal income tax consequences to Non-U.S. Holders

The following discussion is a summary of the material U.S. federal income tax consequences to Non-U.S. Holders (as defined below) of the purchase, ownership and disposition of our common stock issued pursuant to this offering, but does not purport to be a complete analysis of all potential tax effects. The effects of other U.S. federal tax laws, such as estate and gift tax laws, and any applicable state, local or non-U.S. tax laws are not discussed. This discussion is based on the U.S. Internal Revenue Code of 1986, as amended, or the Code, Treasury Regulations promulgated thereunder, judicial decisions, and published rulings and administrative pronouncements of the U.S. Internal Revenue Service, or the IRS, in each case in effect as of the date hereof. These authorities may change or be subject to differing interpretations. Any such change or differing interpretation may be applied retroactively in a manner that could adversely affect a Non-U.S. Holder of our common stock. We have not sought and will not seek any rulings from the IRS regarding the matters discussed below. There can be no assurance the IRS or a court will not take a contrary position to that discussed below regarding the tax consequences of the purchase, ownership and disposition of our common stock.

This discussion is limited to Non-U.S. Holders that hold our common stock as a "capital asset" within the meaning of Section 1221 of the Code (generally, property held for investment). This discussion does not address all U.S. federal income tax consequences relevant to a Non-U.S. Holder's particular circumstances, including the impact of the Medicare contribution tax on net investment income or the alternative minimum tax. In addition, it does not address consequences relevant to Non-U.S. Holders subject to special rules, including, without limitation:

- U.S. expatriates and former citizens or long-term residents of the United States;
- persons holding our common stock as part of a hedge, straddle or other risk reduction strategy or as part of a conversion transaction or other integrated investment;
- banks, insurance companies, and other financial institutions;
- brokers, dealers or traders in securities;
- "controlled foreign corporations," "passive foreign investment companies," and corporations that accumulate earnings to avoid U.S. federal income tax;
- partnerships or other entities or arrangements treated as partnerships for U.S. federal income tax purposes (and investors therein);
- tax-exempt organizations or governmental organizations;
- persons deemed to sell our common stock under the constructive sale provisions of the Code;
- persons who hold or receive our common stock pursuant to the exercise of any employee stock option or otherwise as compensation;
- tax-qualified retirement plans;
- "qualified foreign pension funds" as defined in Section 897(l)(2) of the Code and entities all of the interests of which are held by qualified foreign pension funds;
- persons who own, or are deemed to own, more than 5% of our capital stock (except to the extent specifically set forth below); and
- persons subject to special tax accounting rules as a result of any item of gross income with respect to the stock being taken into account in an applicable financial statement.

If an entity treated as a partnership for U.S. federal income tax purposes holds our common stock, the tax treatment of a partner in the partnership will depend on the status of the partner, the activities of the partnership and certain determinations made at the partner level. Accordingly, partnerships (or other entities treated as a partnership for U.S. federal income tax purposes) holding our common stock and the partners in such partnerships or other entities should consult their tax advisors regarding the U.S. federal income tax consequences to them.

THIS DISCUSSION IS FOR INFORMATIONAL PURPOSES ONLY AND IS NOT TAX ADVICE. INVESTORS SHOULD CONSULT THEIR TAX ADVISORS WITH RESPECT TO THE APPLICATION OF THE U.S. FEDERAL INCOME TAX LAWS TO THEIR PARTICULAR SITUATIONS AS WELL AS ANY TAX CONSEQUENCES OF THE PURCHASE, OWNERSHIP AND DISPOSITION OF OUR COMMON STOCK ARISING UNDER THE U.S. FEDERAL ESTATE OR GIFT TAX LAWS OR UNDER THE LAWS OF ANY STATE, LOCAL OR NON-U.S. TAXING JURISDICTION OR UNDER ANY APPLICABLE INCOME TAX TREATY.

Definition of a Non-U.S. Holder

For purposes of this discussion, a “Non-U.S. Holder” is any beneficial owner of our common stock that is neither a “U.S. person” nor an entity treated as a partnership for U.S. federal income tax purposes.

A U.S. person is any person that, for U.S. federal income tax purposes, is or is treated as any of the following:

- an individual who is a citizen or resident of the United States;
- a corporation, or an entity treated as a corporation, created or organized under the laws of the United States, any state thereof, or the District of Columbia;
- an estate, the income of which is subject to U.S. federal income tax regardless of its source; or
- a trust that (1) is subject to the primary supervision of a U.S. court and the control of one or more “United States persons” (within the meaning of Section 7701(a)(30) of the Code), or (2) has a valid election in effect to be treated as a United States person for U.S. federal income tax purposes.

Distributions

As described in the section entitled “Dividend policy,” we do not anticipate declaring or paying dividends to holders of our common stock in the foreseeable future. However, if we do make distributions of cash or property on our common stock, such distributions will constitute dividends for U.S. federal income tax purposes to the extent paid from our current or accumulated earnings and profits, as determined under U.S. federal income tax principles. Amounts not treated as dividends for U.S. federal income tax purposes will constitute a return of capital and will first be applied against and reduce a Non-U.S. Holder’s adjusted tax basis in our common stock, but not below zero. Any excess will be treated as capital gain and will be treated as described below under “—Sale or other taxable dispositions of common stock.”

Subject to the discussion below on effectively connected income, dividends paid to a Non-U.S. Holder of our common stock will be subject to U.S. federal withholding tax at a rate of 30% of the gross amount of the dividends (or such lower rate specified by an applicable income tax treaty, provided the Non-U.S. Holder timely furnishes a valid IRS Form W-8BEN or W-8BEN-E (or other applicable documentation) certifying qualification for the lower treaty rate). A Non-U.S. Holder that does not timely furnish the required documentation, but that qualifies for a reduced treaty rate, may obtain a refund of any excess amounts withheld by timely filing an appropriate claim for refund with the IRS. Non-U.S. Holders should consult their tax advisors regarding their entitlement to benefits under any applicable income tax treaty.

If dividends paid to a Non-U.S. Holder are effectively connected with the Non-U.S. Holder's conduct of a trade or business within the United States (and, if required by an applicable income tax treaty, the Non-U.S. Holder maintains a permanent establishment in the United States to which such dividends are attributable), the Non-U.S. Holder will be exempt from the U.S. federal withholding tax described above. To claim the exemption, the Non-U.S. Holder must timely furnish to the applicable withholding agent a valid IRS Form W-8ECI (or applicable successor form), certifying that the dividends are effectively connected with the Non-U.S. Holder's conduct of a trade or business within the United States.

Any such effectively connected dividends will be subject to U.S. federal income tax on a net income basis at the regular graduated rates. A Non-U.S. Holder that is a corporation also may be subject to a branch profits tax at a rate of 30% (or such lower rate specified by an applicable income tax treaty) on such effectively connected dividends, as adjusted for certain items. Non-U.S. Holders should consult their tax advisors regarding any applicable tax treaties that may provide for different rules.

Sales or other taxable dispositions of common stock

A Non-U.S. Holder will not be subject to U.S. federal income tax on any gain realized upon the sale or other taxable disposition of our common stock unless:

- the gain is effectively connected with the Non-U.S. Holder's conduct of a trade or business within the United States (and, if required by an applicable income tax treaty, the Non-U.S. Holder maintains a permanent establishment in the United States to which such gain is attributable);
- the Non-U.S. Holder is a nonresident alien individual present in the United States for 183 days or more during the taxable year of the disposition and certain other requirements are met; or
- our common stock constitutes a U.S. real property interest, or USRPI, by reason of our status as a U.S. real property holding corporation, or USRPHC, for U.S. federal income tax purposes.

Gain described in the first bullet point above generally will be subject to U.S. federal income tax on a net income basis at the regular graduated rates. A Non-U.S. Holder that is a corporation also may be subject to a branch profits tax at a rate of 30% (or such lower rate specified by an applicable income tax treaty) on such effectively connected gain, as adjusted for certain items.

Gain described in the second bullet point above will be subject to U.S. federal income tax at a rate of 30% (or such lower rate specified by an applicable income tax treaty), which may be offset by U.S. source capital losses of the Non-U.S. Holder (even though the individual is not considered a resident of the United States), provided the Non-U.S. Holder has timely filed U.S. federal income tax returns with respect to such losses.

With respect to the third bullet point above, we believe we currently are not, and do not anticipate becoming, a USRPHC. Generally, a corporation is a U.S. real property holding corporation only if the fair market value of its U.S. real property interests equals or exceeds 50% of the sum of the fair market value of its worldwide real property interests plus its other assets used or held for use in a trade or business. Because the determination of whether we are a USRPHC depends, however, on the fair market value of our USRPIs relative to the fair market value of our non-U.S. real property interests and our other business assets, there can be no assurance we currently are not a USRPHC or will not become one in the future. Even if we are or were to become a USRPHC, gain arising from the sale or other taxable disposition by a Non-U.S. Holder of our common stock will not be subject to U.S. federal income tax if our common stock is "regularly traded," as defined by applicable Treasury Regulations, on an established securities market, and such Non-U.S. Holder owned, actually and constructively, 5% or less of our common stock throughout the shorter of the five-year period ending on the date of the sale or other taxable disposition or the Non-U.S. Holder's holding period.

Non-U.S. Holders should consult their tax advisors regarding potentially applicable income tax treaties that may provide for different rules.

Information reporting and backup withholding

Payments of dividends on our common stock will not be subject to backup withholding, provided the applicable withholding agent does not have actual knowledge or reason to know the holder is a United States person and the holder either certifies its non-U.S. status, such as by furnishing a valid IRS Form W-8BEN, W-8BEN-E or W-8ECI, or otherwise establishes an exemption. However, information returns are required to be filed with the IRS in connection with any dividends on our common stock paid to the Non-U.S. Holder, regardless of whether any tax was actually withheld.

In addition, proceeds of the sale or other taxable disposition of our common stock within the United States, or conducted through certain U.S.-related brokers generally will not be subject to backup withholding or information reporting, if the applicable withholding agent receives the certification described above and does not have actual knowledge or reason to know that such holder is a United States person, or the holder otherwise establishes an exemption. Proceeds of a disposition of our common stock conducted through a non-U.S. office of a non-U.S. broker generally will not be subject to backup withholding or information reporting. Non-U.S. holders should consult their tax advisors regarding the application of the information reporting and backup withholding rules to them.

Copies of information returns that are filed with the IRS may also be made available under the provisions of an applicable treaty or agreement to the tax authorities of the country in which the Non-U.S. Holder resides or is established.

Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules may be allowed as a refund or a credit against a Non-U.S. Holder's U.S. federal income tax liability, provided the required information is timely furnished to the IRS.

Additional withholding tax on payments made to foreign accounts

Withholding taxes may be imposed under Sections 1471 to 1474 of the Code (such Sections commonly referred to as the Foreign Account Tax Compliance Act, or FATCA) on certain types of payments made to non-U.S. financial institutions and certain other non-U.S. entities. Specifically, a 30% withholding tax may be imposed on dividends on, or gross proceeds from the sale or other disposition of, our common stock paid to a "foreign financial institution" or a "non-financial foreign entity" (each as defined in the Code), unless (1) the foreign financial institution undertakes certain diligence and reporting obligations, (2) the non-financial foreign entity either certifies it does not have any "substantial United States owners" (as defined in the Code) or furnishes identifying information regarding each substantial United States owner, or (3) the foreign financial institution or non-financial foreign entity otherwise qualifies for an exemption from these rules. If the payee is a foreign financial institution and is subject to the diligence and reporting requirements in (1) above, it must enter into an agreement with the U.S. Department of the Treasury requiring, among other things, that it undertake to identify accounts held by certain "specified United States persons" or "United States-owned foreign entities" (each as defined in the Code), annually report certain information about such accounts, and withhold 30% on certain payments to non-compliant foreign financial institutions and certain other account holders. Foreign financial institutions located in jurisdictions that have an intergovernmental agreement with the United States governing FATCA may be subject to different rules.

Under the applicable Treasury Regulations and administrative guidance, withholding under FATCA generally applies to payments of dividends on our common stock, and subject to the recently released proposed Treasury

Regulations described below, will apply to payments of gross proceeds from the sale or other disposition of such stock on or after January 1, 2019. The Treasury Department recently released proposed Treasury Regulations which, if finalized in their present form, would eliminate the federal withholding tax of 30% applicable to the gross proceeds of a sale or other disposition of our common stock. In its preamble to such proposed Treasury Regulations, the Treasury Department stated that taxpayers may generally rely on the proposed Treasury Regulations until final Treasury Regulations are issued.

Prospective investors should consult their tax advisors regarding the potential application of withholding under FATCA to their investment in our common stock.

Underwriting

We are offering the shares of common stock described in this prospectus through a number of underwriters. J.P. Morgan Securities LLC, Goldman Sachs & Co. LLC, Jefferies LLC and Barclays Capital Inc. are acting as joint book-running managers of the offering and as representatives of the underwriters. We have entered into an underwriting agreement with the underwriters. Subject to the terms and conditions of the underwriting agreement, we have agreed to sell to the underwriters, and each underwriter has severally agreed to purchase, at the public offering price less the underwriting discounts and commissions set forth on the cover page of this prospectus, the number of shares of common stock listed next to its name in the following table:

Name	Number of shares
J.P. Morgan Securities LLC	
Goldman Sachs & Co. LLC	
Jefferies LLC	
Barclays Capital Inc.	
Total	7,900,000

The underwriters are committed to purchase all the shares of common stock offered by us if they purchase any shares. The underwriting agreement also provides that if an underwriter defaults, the purchase commitments of non-defaulting underwriters may also be increased or the offering may be terminated.

The underwriters propose to offer the common stock directly to the public at the initial public offering price set forth on the cover page of this prospectus and to certain dealers at that price less a concession not in excess of $ per share. Any such dealers may resell shares to certain other brokers or dealers at a discount of up to $ per share from the initial public offering price. After the initial offering of the shares to the public, if all of the shares of common stock are not sold at the initial public offering price, the underwriters may change the offering price and the other selling terms. Sales of shares made outside of the United States may be made by affiliates of the underwriters.

The underwriters have an option to buy up to 1,185,000 additional shares of common stock from us to cover sales of shares by the underwriters which exceed the number of shares specified in the table above. The underwriters have 30 days from the date of this prospectus to exercise this option to purchase additional shares. If any shares are purchased with this option to purchase additional shares, the underwriters will purchase shares in approximately the same proportion as shown in the table above. If any additional shares of common stock are purchased, the underwriters will offer the additional shares on the same terms as those on which the shares are being offered.

The underwriting fee is equal to the public offering price per share of common stock less the amount paid by the underwriters to us per share of common stock. The underwriting fee is $ per share. The following table shows the per share and total underwriting discounts and commissions to be paid to the underwriters assuming both no exercise and full exercise of the underwriters' option to purchase additional shares.

	Without option to purchase additional shares exercise	With full option to purchase additional shares exercise
Per Share	$	$
Total	$	$

We estimate that the total expenses of this offering, including registration, filing and listing fees, printing fees and legal and accounting expenses, but excluding the underwriting discounts and commissions, will be approximately $4.3 million. We have agreed to reimburse the underwriters for expenses relating to the clearance of this offering with the Financial Industry Regulatory Authority, Inc. in an amount up to $35,000.

A prospectus in electronic format may be made available on the web sites maintained by one or more underwriters, or selling group members, if any, participating in the offering. The underwriters may agree to allocate a number of shares to underwriters and selling group members for sale to their online brokerage account holders. Internet distributions will be allocated by the representatives to underwriters and selling group members that may make Internet distributions on the same basis as other allocations.

We have agreed that, subject to certain exceptions, we will not (1) offer, pledge, announce the intention to sell, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase or otherwise dispose of, directly or indirectly, or file with, the SEC a registration statement under the Securities Act relating to, any shares of our common stock or securities convertible into or exchangeable or exercisable for any shares of our common stock, or publicly disclose the intention to make any offer, sale, pledge, disposition or filing, or (2) enter into any swap or other arrangement that transfers all or a portion of the economic consequences associated with the ownership of any shares of common stock or any such other securities (regardless of whether any of these transactions are to be settled by the delivery of shares of common stock or such other securities, in cash or otherwise), in each case without the prior written consent of J.P. Morgan Securities LLC, Goldman Sachs & Co. LLC and Jefferies LLC for a period of 180 days after the date of this prospectus.

Our directors and executive officers, and substantially all of our securityholders have entered into lock-up agreements with the underwriters prior to the commencement of this offering pursuant to which each of these persons or entities, with limited exceptions, for a period of 180 days after the date of this prospectus, may not, without the prior written consent of J.P. Morgan Securities LLC, Goldman Sachs & Co. LLC and Jefferies LLC (1) offer, pledge, announce the intention to sell, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, any shares of our common stock or any securities convertible into or exercisable or exchangeable for our common stock (including, without limitation, common stock or such other securities which may be deemed to be beneficially owned by such directors, executive officers, managers and members in accordance with the rules and regulations of the SEC and securities which may be issued upon exercise of a stock option or warrant) or (2) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of the common stock or such other securities, whether any such transaction described in clause (1) or (2) above is to be settled by delivery of common stock or such other securities, in cash or otherwise, or (3) make any demand for or exercise any right with respect to the registration of any shares of our common stock or any security convertible into or exercisable or exchangeable for our common stock.

We have agreed to indemnify the underwriters against certain liabilities, including liabilities under the Securities Act.

We have applied to have our common stock approved for listing on The Nasdaq Global Market under the symbol “DTIL.”

In connection with this offering, the underwriters may engage in stabilizing transactions, which involves making bids for, purchasing and selling shares of common stock in the open market for the purpose of preventing or retarding a decline in the market price of the common stock while this offering is in progress. These stabilizing transactions may include making short sales of the common stock, which involves the sale by the underwriters

of a greater number of shares of common stock than they are required to purchase in this offering, and purchasing shares of common stock on the open market to cover positions created by short sales. Short sales may be “covered” shorts, which are short positions in an amount not greater than the underwriters’ option to purchase additional shares referred to above, or may be “naked” shorts, which are short positions in excess of that amount. The underwriters may close out any covered short position either by exercising their option to purchase additional shares, in whole or in part, or by purchasing shares in the open market. In making this determination, the underwriters will consider, among other things, the price of shares available for purchase in the open market compared to the price at which the underwriters may purchase shares through the option to purchase additional shares. A naked short position is more likely to be created if the underwriters are concerned that there may be downward pressure on the price of the common stock in the open market that could adversely affect investors who purchase in this offering. To the extent that the underwriters create a naked short position, they will purchase shares in the open market to cover the position.

The underwriters have advised us that, pursuant to Regulation M of the Securities Act, they may also engage in other activities that stabilize, maintain or otherwise affect the price of the common stock, including the imposition of penalty bids. This means that if the representatives of the underwriters purchase common stock in the open market in stabilizing transactions or to cover short sales, the representatives can require the underwriters that sold those shares as part of this offering to repay the underwriting discount received by them.

These activities may have the effect of raising or maintaining the market price of the common stock or preventing or retarding a decline in the market price of the common stock, and, as a result, the price of the common stock may be higher than the price that otherwise might exist in the open market. If the underwriters commence these activities, they may discontinue them at any time. The underwriters may carry out these transactions on The Nasdaq Global Market, in the over-the-counter market or otherwise.

Prior to this offering, there has been no public market for our common stock. The initial public offering price will be determined by negotiations between us and the representatives of the underwriters. In determining the initial public offering price, we and the representatives of the underwriters expect to consider a number of factors including:

- the information set forth in this prospectus and otherwise available to the representatives;
- our prospects and the history and prospects for the industry in which we compete;
- an assessment of our management;
- our prospects for future earnings;
- the general condition of the securities markets at the time of this offering;
- the recent market prices of, and demand for, publicly traded common stock of generally comparable companies; and
- other factors deemed relevant by the underwriters and us.

Neither we nor the underwriters can assure investors that an active trading market will develop for our common stock, or that shares of our common stock will trade in the public market at or above the initial public offering price.

Other relationships

The underwriters and their respective affiliates are full service financial institutions engaged in various activities, which may include sales and trading, commercial and investment banking, advisory, investment

management, investment research, principal investment, hedging, market making, brokerage and other financial and non-financial activities and services. Certain of the underwriters and their respective affiliates have provided, and may in the future provide, a variety of these services to us and to persons and entities with relationships with us, for which they received or will receive customary fees and expenses.

In the ordinary course of their various business activities, the underwriters and their respective affiliates, officers, directors and employees may purchase, sell or hold a broad array of investments and actively trade securities, derivatives, loans, commodities, currencies, credit default swaps and other financial instruments for their own account and for the accounts of their customers, and such investment and trading activities may involve or relate to assets, securities and/or instruments of ours (directly, as collateral securing other obligations or otherwise) and/or persons and entities with relationships with us, including long or short positions in our debt or equity securities or loans. The underwriters and their respective affiliates may also communicate independent investment recommendations, market color or trading ideas and/or publish or express independent research views in respect of such assets, securities or instruments and may at any time hold, or recommend to clients that they should acquire, long and/or short positions in such assets, securities and instruments.

Selling restrictions

Other than in the United States, no action has been taken by us or the underwriters that would permit a public offering of the securities offered by this prospectus in any jurisdiction where action for that purpose is required. The securities offered by this prospectus may not be offered or sold, directly or indirectly, nor may this prospectus or any other offering material or advertisements in connection with the offer and sale of any such securities be distributed or published in any jurisdiction, except under circumstances that will result in compliance with the applicable rules and regulations of that jurisdiction. Persons into whose possession this prospectus comes are advised to inform themselves about and to observe any restrictions relating to the offering and the distribution of this prospectus. This prospectus does not constitute an offer to sell or a solicitation of an offer to buy any securities offered by this prospectus in any jurisdiction in which such an offer or a solicitation is unlawful.

Notice to prospective investors in the European Economic Area

In relation to each Member State of the European Economic Area which has implemented the Prospectus Directive, (each, a “Relevant Member State”), with effect from and including the date on which the Prospectus Directive is implemented in that Relevant Member State, no offer of shares may be made to the public in that Relevant Member State other than:

(1) to any legal entity which is a qualified investor as defined in the Prospectus Directive;

(2) to fewer than 150 natural or legal persons (other than qualified investors as defined in the Prospectus Directive), subject to obtaining the prior consent of the underwriters; or

(3) in any other circumstances falling within Article 3(2) of the Prospectus Directive,

provided that no such offer of shares shall require the Company or any underwriter to publish a prospectus pursuant to Article 3 of the Prospectus Directive or supplement a prospectus pursuant to Article 16 of the Prospectus Directive and each person who initially acquires any shares or to whom any offer is made will be deemed to have represented, acknowledged and agreed to and with each of the underwriters and the Company that it is a “qualified investor” within the meaning of the law in that Relevant Member State implementing Article 2(1)(e) of the Prospectus Directive.

In the case of any shares being offered to a financial intermediary as that term is used in Article 3(2) of the Prospectus Directive, each such financial intermediary will be deemed to have represented, acknowledged and agreed that the shares acquired by it in the offer have not been acquired on a non-discretionary basis on behalf of, nor have they been acquired with a view to their offer or resale to, persons in circumstances which may give rise to an offer of any shares to the public other than their offer or resale in a Relevant Member State to qualified investors as so defined or in circumstances in which the prior consent of the representatives has been obtained to each such proposed offer or resale.

For the purposes of this provision, the expression an "offer of shares to the public" in relation to any shares in any Relevant Member State means the communication in any form and by means of sufficient information on the terms of the offer and the shares to be offered so as to enable an investor to decide to purchase shares, as the same may be varied in that Member State by any measure implementing the Prospectus Directive in that Member State, the expression "Prospectus Directive" means Directive 2003/71/EC (as amended, including by Directive 2010/73/EU), and includes any relevant implementing measure in the Relevant Member State.

Notice to prospective investors in the United Kingdom

In addition, in the United Kingdom, this document is being distributed only to, and is directed only at, and any offer subsequently made may only be directed at persons who are "qualified investors" (as defined in the Prospectus Directive) (1) who have professional experience in matters relating to investments falling within Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005, as amended (the "Order") and/or (2) who are high net worth companies (or persons to whom it may otherwise be lawfully communicated) falling within Article 49(2)(a) to (d) of the Order (all such persons together being referred to as "relevant persons") or otherwise in circumstances which have not resulted and will not result in an offer to the public of the shares in the United Kingdom within the meaning of the Financial Services and Markets Act 2000.

Any person in the United Kingdom that is not a relevant person should not act or rely on the information included in this document or use it as basis for taking any action. In the United Kingdom, any investment or investment activity that this document relates to may be made or taken exclusively by relevant persons.

Notice to prospective investors in Canada

The shares may be sold only to purchasers purchasing, or deemed to be purchasing, as principal that are accredited investors, as defined in National Instrument 45-106 Prospectus Exemptions or subsection 73.3(1) of the Securities Act (Ontario), and are permitted clients, as defined in National Instrument 31-103 Registration Requirements, Exemptions and Ongoing Registrant Obligations. Any resale of the shares must be made in accordance with an exemption from, or in a transaction not subject to, the prospectus requirements of applicable securities laws.

Securities legislation in certain provinces or territories of Canada may provide a purchaser with remedies for rescission or damages if this prospectus (including any amendment thereto) contains a misrepresentation, provided that the remedies for rescission or damages are exercised by the purchaser within the time limit prescribed by the securities legislation of the purchaser's province or territory. The purchaser should refer to any applicable provisions of the securities legislation of the purchaser's province or territory for particulars of these rights or consult with a legal advisor.

Pursuant to section 3A.3 of National Instrument 33-105 Underwriting Conflicts, or NI 33-105, the underwriters are not required to comply with the disclosure requirements of NI 33-105 regarding underwriter conflicts of interest in connection with this offering.

Notice to prospective investors in Switzerland

The shares may not be publicly offered in Switzerland and will not be listed on the SIX Swiss Exchange, or the SIX, or on any other stock exchange or regulated trading facility in Switzerland. This document does not constitute a prospectus within the meaning of, and has been prepared without regard to the disclosure standards for issuance prospectuses under art. 652a or art. 1156 of the Swiss Code of Obligations or the disclosure standards for listing prospectuses under art. 27 ff. of the SIX Listing Rules or the listing rules of any other stock exchange or regulated trading facility in Switzerland. Neither this document nor any other offering or marketing material relating to the shares or the offering may be publicly distributed or otherwise made publicly available in Switzerland.

Neither this document nor any other offering or marketing material relating to the offering, the Company or the shares has been or will be filed with or approved by any Swiss regulatory authority. In particular, this document will not be filed with, and the offer of shares will not be supervised by, the Swiss Financial Market Supervisory Authority FINMA, and the offer of shares has not been and will not be authorized under the Swiss Federal Act on Collective Investment Schemes, or the CISA. The investor protection afforded to acquirers of interests in collective investment schemes under the CISA does not extend to acquirers of shares.

Notice to prospective investors in the Dubai International Financial Centre ("DIFC")

This document relates to an Exempt Offer in accordance with the Markets Rules 2012 of the Dubai Financial Services Authority, or the DFSA. This document is intended for distribution only to persons of a type specified in the Markets Rules 2012 of the DFSA. It must not be delivered to, or relied on by, any other person. The DFSA has no responsibility for reviewing or verifying any documents in connection with Exempt Offers. The DFSA has not approved this prospectus supplement nor taken steps to verify the information set forth herein and has no responsibility for this document. The securities to which this document relates may be illiquid and/or subject to restrictions on their resale. Prospective purchasers of the securities offered should conduct their own due diligence on the securities. If you do not understand the contents of this document you should consult an authorized financial advisor.

In relation to its use in the DIFC, this document is strictly private and confidential and is being distributed to a limited number of investors and must not be provided to any person other than the original recipient, and may not be reproduced or used for any other purpose. The interests in the securities may not be offered or sold directly or indirectly to the public in the DIFC.

Notice to prospective investors in the United Arab Emirates

The shares have not been, and are not being, publicly offered, sold, promoted or advertised in the United Arab Emirates (including the Dubai International Financial Centre) other than in compliance with the laws of the United Arab Emirates (and the Dubai International Financial Centre) governing the issue, offering and sale of securities. Further, this prospectus does not constitute a public offer of securities in the United Arab Emirates (including the Dubai International Financial Centre) and is not intended to be a public offer. This prospectus has not been approved by or filed with the Central Bank of the United Arab Emirates, the Securities and Commodities Authority or the Dubai Financial Services Authority.

Notice to prospective investors in Australia

This prospectus:

- does not constitute a product disclosure document or a prospectus under Chapter 6D.2 of the Corporations Act 2001 (Cth), or the Corporations Act;

- has not been, and will not be, lodged with the Australian Securities and Investments Commission, or ASIC, as a disclosure document for the purposes of the Corporations Act and does not purport to include the information required of a disclosure document under Chapter 6D.2 of the Corporations Act;
- does not constitute or involve a recommendation to acquire, an offer or invitation for issue or sale, an offer or invitation to arrange the issue or sale, or an issue or sale, of interests to a "retail client" (as defined in section 761G of the Corporations Act and applicable regulations) in Australia; and
- may only be provided in Australia to select investors who are able to demonstrate that they fall within one or more of the categories of investors, or Exempt Investors, available under section 708 of the Corporations Act.

The shares may not be directly or indirectly offered for subscription or purchased or sold, and no invitations to subscribe for or buy the shares may be issued, and no draft or definitive offering memorandum, advertisement or other offering material relating to any shares may be distributed in Australia, except where disclosure to investors is not required under Chapter 6D of the Corporations Act or is otherwise in compliance with all applicable Australian laws and regulations. By submitting an application for the shares, you represent and warrant to us that you are an Exempt Investor.

As any offer of shares under this document will be made without disclosure in Australia under Chapter 6D.2 of the Corporations Act, the offer of those securities for resale in Australia within 12 months may, under section 707 of the Corporations Act, require disclosure to investors under Chapter 6D.2 if none of the exemptions in section 708 applies to that resale. By applying for the shares you undertake to us that you will not, for a period of 12 months from the date of issue of the shares, offer, transfer, assign or otherwise alienate those securities to investors in Australia except in circumstances where disclosure to investors is not required under Chapter 6D.2 of the Corporations Act or where a compliant disclosure document is prepared and lodged with ASIC.

Notice to prospective investors in Japan

The shares have not been and will not be registered pursuant to Article 4, Paragraph 1 of the Financial Instruments and Exchange Act. Accordingly, none of the shares nor any interest therein may be offered or sold, directly or indirectly, in Japan or to, or for the benefit of, any "resident" of Japan (which term as used herein means any person resident in Japan, including any corporation or other entity organized under the laws of Japan), or to others for re-offering or resale, directly or indirectly, in Japan or to or for the benefit of a resident of Japan, except pursuant to an exemption from the registration requirements of, and otherwise in compliance with, the Financial Instruments and Exchange Act and any other applicable laws, regulations and ministerial guidelines of Japan in effect at the relevant time.

Notice to prospective investors in Hong Kong

The shares have not been offered or sold and will not be offered or sold in Hong Kong, by means of any document, other than (1) to "professional investors" as defined in the Securities and Futures Ordinance (Cap. 571) of Hong Kong and any rules made under that Ordinance or (2) in other circumstances which do not result in the document being a "prospectus" as defined in the Companies (Winding Up and Miscellaneous Provisions) Ordinance (Cap. 32) of Hong Kong or which do not constitute an offer to the public within the meaning of that Ordinance. No advertisement, invitation or document relating to the shares has been or may be issued or has been or may be in the possession of any person for the purposes of issue, whether in Hong Kong or elsewhere, which is directed at, or the contents of which are likely to be accessed or read by, the public of Hong Kong (except if permitted to do so under the securities laws of Hong Kong) other than with respect to shares which are or are intended to be disposed of only to persons outside Hong Kong or only to "professional investors" as defined in the Securities and Futures Ordinance and any rules made under that Ordinance.

Notice to prospective investors in Singapore

This prospectus has not been registered as a prospectus with the Monetary Authority of Singapore. Accordingly, this prospectus and any other document or material in connection with the offer or sale, or invitation for subscription or purchase, of shares may not be circulated or distributed, nor may the shares be offered or sold, or be made the subject of an invitation for subscription or purchase, whether directly or indirectly, to persons in Singapore other than (1) to an institutional investor under Section 274 of the Securities and Futures Act, Chapter 289 of Singapore, or the SFA, (2) to a relevant person pursuant to Section 275(1), or any person pursuant to Section 275(1A), and in accordance with the conditions specified in Section 275 of the SFA, or (3) otherwise pursuant to, and in accordance with the conditions of, any other applicable provision of the SFA.

Where the shares are subscribed or purchased under Section 275 of the SFA by a relevant person which is:

(a) a corporation (which is not an accredited investor (as defined in Section 4A of the SFA)) the sole business of which is to hold investments and the entire share capital of which is owned by one or more individuals, each of whom is an accredited investor; or

(b) a trust (where the trustee is not an accredited investor) whose sole purpose is to hold investments and each beneficiary of the trust is an individual who is an accredited investor,

securities (as defined in Section 239(1) of the SFA) of that corporation or the beneficiaries' rights and interest (howsoever described) in that trust shall not be transferred within six months after that corporation or that trust has acquired the shares pursuant to an offer made under Section 275 of the SFA except:

(a) to an institutional investor or to a relevant person defined in Section 275(2) of the SFA, or to any person arising from an offer referred to in Section 275(1A) or Section 276(4)(i)(B) of the SFA;

(b) where no consideration is or will be given for the transfer;

(c) where the transfer is by operation of law;

(d) as specified in Section 276(7) of the SFA; or

(e) as specified in Regulation 32 of the Securities and Futures (Offers of Investments) (Shares and Debentures) Regulations 2005 of Singapore.

Solely for the purposes of its obligations pursuant to Section 309B of the SFA, we have determined, and hereby notify all relevant persons (as defined in the CMP Regulations 2018), that the shares are ‘‘prescribed capital markets products’’ (as defined in the CMP Regulations 2018) and Excluded Investment Products (as defined in MAS Notice SFA 04-N12: Notice on the Sale of Investment Products and MAS Notice FAA-N16: Notice on Recommendations on Investment Products).

Notice to prospective investors in Bermuda

Shares may be offered or sold in Bermuda only in compliance with the provisions of the Investment Business Act of 2003 of Bermuda which regulates the sale of securities in Bermuda. Additionally, non-Bermudian persons (including companies) may not carry on or engage in any trade or business in Bermuda unless such persons are permitted to do so under applicable Bermuda legislation.

Notice to prospective investors in Saudi Arabia

This document may not be distributed in the Kingdom of Saudi Arabia except to such persons as are permitted under the Offers of Securities Regulations as issued by the board of the Saudi Arabian Capital Market Authority,

or the CMA, pursuant to resolution number 2-11-2004 dated 4 October 2004 as amended by resolution number 1-28-2008, as amended, or the CMA Regulations. The CMA does not make any representation as to the accuracy or completeness of this document and expressly disclaims any liability whatsoever for any loss arising from, or incurred in reliance upon, any part of this document. Prospective purchasers of the securities offered hereby should conduct their own due diligence on the accuracy of the information relating to the securities. If you do not understand the contents of this document, you should consult an authorised financial adviser.

Notice to prospective investors in the British Virgin Islands

The shares are not being, and may not be offered to the public or to any person in the British Virgin Islands for purchase or subscription by or on behalf of the Company. The Company may be offered to companies incorporated under the BVI Business Companies Act, 2004 (British Virgin Islands), but only where the offer will be made to, and received by, the relevant BVI Company entirely outside of the British Virgin Islands. This prospectus has not been, and will not be, registered with the Financial Services Commission of the British Virgin Islands. No registered prospectus has been or will be prepared in respect of the shares for the purposes of the Securities and Investment Business Act, 2010 or the Public Issuers Code of the British Virgin Islands.

Notice to prospective investors in China

This prospectus does not constitute a public offer of shares, whether by sale or subscription, in the People's Republic of China, or the PRC. The shares are not being offered or sold directly or indirectly in the PRC to or for the benefit of, legal or natural persons of the PRC.

Further, no legal or natural persons of the PRC may directly or indirectly purchase any of the shares or any beneficial interest therein without obtaining all prior PRC's governmental approvals that are required, whether statutorily or otherwise. Persons who come into possession of this document are required by the issuer and its representatives to observe these restrictions.

Notice to prospective investors in Korea

The shares have not been and will not be registered under the Financial Investments Services and Capital Markets Act of Korea and the decrees and regulations thereunder, or the FSCMA, and the shares have been and will be offered in Korea as a private placement under the FSCMA. None of the shares may be offered, sold or delivered directly or indirectly, or offered or sold to any person for re-offering or resale, directly or indirectly, in Korea or to any resident of Korea except pursuant to the applicable laws and regulations of Korea, including the FSCMA and the Foreign Exchange Transaction Law of Korea and the decrees and regulations thereunder, or the FETL. Furthermore, the purchaser of the shares shall comply with all applicable regulatory requirements (including but not limited to requirements under the FETL) in connection with the purchase of the shares. By the purchase of the shares, the relevant holder thereof will be deemed to represent and warrant that if it is in Korea or is a resident of Korea, it purchased the shares pursuant to the applicable laws and regulations of Korea.

Notice to prospective investors in Malaysia

No prospectus or other offering material or document in connection with the offer and sale of the shares has been or will be registered with the Securities Commission of Malaysia, or the Commission, for the Commission's approval pursuant to the Capital Markets and Services Act 2007. Accordingly, this prospectus and any other document or material in connection with the offer or sale, or invitation for subscription or purchase, of the shares may not be circulated or distributed, nor may the shares be offered or sold, or be made the subject of an

invitation for subscription or purchase, whether directly or indirectly, to persons in Malaysia other than (1) a closed end fund approved by the Commission, (2) a holder of a Capital Markets Services Licence, (3) a person who acquires the shares, as principal, if the offer is on terms that the shares may only be acquired at a consideration of not less than RM250,000 (or its equivalent in foreign currencies) for each transaction, (4) an individual whose total net personal assets or total net joint assets with his or her spouse exceeds RM3 million (or its equivalent in foreign currencies), excluding the value of the primary residence of the individual, (5) an individual who has a gross annual income exceeding RM300,000 (or its equivalent in foreign currencies) per annum in the preceding 12 months, (6) an individual who, jointly with his or her spouse, has a gross annual income of RM400,000 (or its equivalent in foreign currencies), per annum in the preceding 12 months, (7) a corporation with total net assets exceeding RM10 million (or its equivalent in a foreign currencies) based on the last audited accounts, (8) a partnership with total net assets exceeding RM10 million (or its equivalent in foreign currencies), (9) a bank licensee or insurance licensee as defined in the Labuan Financial Services and Securities Act 2010, (10) an Islamic bank licensee or takaful licensee as defined in the Labuan Financial Services and Securities Act 2010, and (11) any other person as may be specified by the Commission; provided that, in the each of the preceding categories (1) to (11), the distribution of the shares is made by a holder of a Capital Markets Services Licence who carries on the business of dealing in securities. The distribution in Malaysia of this prospectus is subject to Malaysian laws. This prospectus does not constitute and may not be used for the purpose of public offering or an issue, offer for subscription or purchase, invitation to subscribe for or purchase any securities requiring the registration of a prospectus with the Commission under the Capital Markets and Services Act 2007.

Notice to prospective investors in Taiwan

The shares have not been and will not be registered with the Financial Supervisory Commission of Taiwan pursuant to relevant securities laws and regulations and may not be sold, issued or offered within Taiwan through a public offering or in circumstances which constitutes an offer within the meaning of the Securities and Exchange Act of Taiwan that requires a registration or approval of the Financial Supervisory Commission of Taiwan. No person or entity in Taiwan has been authorised to offer, sell, give advice regarding or otherwise intermediate the offering and sale of the shares in Taiwan.

Notice to prospective investors in South Africa

Due to restrictions under the securities laws of South Africa, the shares are not offered, and the offer shall not be transferred, sold, renounced or delivered, in South Africa or to a person with an address in South Africa, unless one or other of the following exemptions applies:

(1) the offer, transfer, sale, renunciation or delivery is to:

(a) persons whose ordinary business is to deal in securities, as principal or agent;

(b) the South African Public Investment Corporation;

(c) persons or entities regulated by the Reserve Bank of South Africa;

(d) authorised financial service providers under South African law;

(e) financial institutions recognised as such under South African law;

(f) a wholly-owned subsidiary of any person or entity contemplated in (c), (d) or (e), acting as agent in the capacity of an authorised portfolio manager for a pension fund or collective investment scheme (in each case duly registered as such under South African law); or

(g) any combination of the person in (a) to (f); or

(2) the total contemplated acquisition cost of the securities, for any single addressee acting as principal is equal to or greater than ZAR1,000,000.

No “offer to the public” (as such term is defined in the South African Companies Act, No. 71 of 2008 (as amended or re-enacted), or the South African Companies Act, in South Africa is being made in connection with the issue of the shares. Accordingly, this document does not, nor is it intended to, constitute a “registered prospectus” (as that term is defined in the South African Companies Act) prepared and registered under the South African Companies Act and has not been approved by, and/or filed with, the South African Companies and Intellectual Property Commission or any other regulatory authority in South Africa. Any issue or offering of the shares in South Africa constitutes an offer of the shares in South Africa for subscription or sale in South Africa only to persons who fall within the exemption from “offers to the public” set out in section 96(1)(a) of the South African Companies Act. Accordingly, this document must not be acted on or relied on by persons in South Africa who do not fall within section 96(1)(a) of the South African Companies Act (such persons being referred to as “SA Relevant Persons”). Any investment or investment activity to which this document relates is available in South Africa only to SA Relevant Persons and will be engaged in South Africa only with SA relevant persons.

Legal matters

The validity of the shares of common stock offered hereby and certain other legal matters will be passed upon for us by Smith, Anderson, Blount, Dorsett, Mitchell & Jernigan, LLP, Raleigh, North Carolina, and certain other legal matters in connection with this offering will be passed upon for us by Latham & Watkins LLP. Certain legal matters in connection with this offering will be passed upon for the underwriters by Cooley LLP, New York, New York.

Experts

The financial statements included in this prospectus have been audited by Deloitte & Touche LLP, an independent registered public accounting firm, as stated in their report appearing herein. Such financial statements are included in reliance upon the report of such firm given upon their authority as experts in accounting and auditing.

Where you can find more information

We have filed with the SEC a registration statement on Form S-1 under the Securities Act with respect to the shares of common stock offered hereby. This prospectus, which constitutes a part of the registration statement, does not contain all of the information set forth in the registration statement or the exhibits and schedules filed therewith. For further information about us and the common stock offered hereby, we refer you to the registration statement and the exhibits and schedules filed therewith. Statements contained in this prospectus regarding the contents of any contract or any other document that is filed as an exhibit to the registration statement are not necessarily complete, and each such statement is qualified in all respects by reference to the full text of such contract or other document filed as an exhibit to the registration statement. Upon completion of this offering, we will be required to file periodic reports, proxy statements, and other information with the SEC pursuant to the Exchange Act. You can read our SEC filings, including the registration statement, at the SEC's website at www.sec.gov. We also maintain a website at www.precisionbiosciences.com. The information contained in, or accessible through, our website does not constitute a part of this prospectus.

Precision BioSciences, Inc.
Index to consolidated financial statements

Report of independent registered public accounting firm

To the stockholders and the Board of Directors of Precision BioSciences, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Precision BioSciences, Inc. (the “Company”) as of December 31, 2018 and 2017, the related consolidated statements of operations, changes in stockholders’ equity (deficit) and cash flows, for each of the two years in the period ended December 31, 2018, and the related notes (collectively referred to as the “financial statements”). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2018, in conformity with accounting principles generally accepted in the United States of America.

Basis for Opinion

These financial statements are the responsibility of the Company’s management. Our responsibility is to express an opinion on the Company’s financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits, we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company’s internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Deloitte & Touche LLP

Raleigh, North Carolina
February 21, 2019 (March 18, 2019 as to Note 15)

We have served as the Company’s auditor since 2017.

Precision BioSciences, Inc.
Consolidated balance sheets

(In thousands, except share and per share amounts)	December 31, 2017	December 31, 2018	Pro forma December 31, 2018 (unaudited)
Assets			
Current assets:			
Cash and cash equivalents	$ 62,802	$103,193	$ 103,193
Accounts receivable	—	523	523
Prepaid expenses	1,437	8,913	8,913
Other current assets	92	3,046	3,046
Total current assets	64,331	115,675	115,675
Property, equipment, and software—net	8,137	21,147	21,147
Intangible assets—net	90	1,466	1,466
Other assets	124	312	312
Total assets	$ 72,682	$138,600	$ 138,600
Liabilities and Stockholders' Equity (Deficit)			
Current liabilities:			
Accounts payable	$ 1,806	$ 2,218	$ 2,218
Accrued expenses and other current liabilities	1,573	3,421	3,421
Deferred revenue	5,824	8,436	8,436
Total current liabilities	9,203	14,075	14,075
Deferred revenue—noncurrent	88,596	82,807	82,807
Deferred rent—noncurrent	1,252	1,758	1,758
Total liabilities	99,051	98,640	98,640
Commitments and contingencies (Note 9)			
Stockholders' equity (deficit):			
Series A convertible preferred stock; $0.0001 par value—25,650,000 shares authorized as of December 31, 2017 and 2018; 25,650,000 shares issued and outstanding as of December 31, 2017 and 2018; no shares issued and outstanding as of December 31, 2018, pro forma (unaudited)	3	3	—
Series B convertible preferred stock; $0.0001 par value—no shares authorized, issued and outstanding as of December 31, 2017; 21,956,100 shares authorized and 21,956,095 shares issued and outstanding as of December 31, 2018; no shares issued or outstanding as of December 31, 2018, pro forma (unaudited)	—	2	—
Common stock; $0.000005 par value—100,000,000 shares authorized, 16,496,801 shares issued and 15,686,329 shares outstanding as of December 31, 2017; 130,000,000 shares authorized, 16,717,117 shares issued and 15,906,645 shares outstanding as of December 31, 2018; 39,018,307 issued and 38,207,835 outstanding, pro forma (unaudited)	—	—	—
Additional paid-in capital	13,691	126,094	126,099
Accumulated deficit	(39,111)	(85,187)	(85,187)
Treasury stock (at cost, 810,472 shares of common stock at December 31, 2017 and 2018)	(952)	(952)	(952)
Total stockholders' equity (deficit)	(26,369)	39,960	39,960
Total liabilities and stockholders' equity (deficit)	$ 72,682	$138,600	$ 138,600

See notes to consolidated financial statements

Precision BioSciences, Inc.
Consolidated statements of operations

(In thousands, except share and per share amounts)	Years ended December 31, 2017	2018
Revenue	$ 6,484	$ 10,883
Operating expenses:		
Research and development	20,324	45,122
General and administrative	8,016	13,673
Impairment of intangible assets	118	—
Total operating expenses	28,458	58,795
Loss from operations	(21,974)	(47,912)
Other income:		
Interest income	872	1,875
Net loss and net loss attributable to common stockholders	$ (21,102)	$ (46,037)
Net loss per share attributable to common stockholders-basic and diluted	$ (1.33)	$ (2.92)
Weighted-average shares of common stock outstanding-basic and diluted	15,906,793	15,775,541
Pro forma net loss per share attributable to common stockholders-basic and diluted (unaudited)		$ (1.37)
Pro forma weighted-average shares of common stock outstanding-basic and diluted (unaudited)		33,653,835

See notes to consolidated financial statements

Precision BioSciences, Inc.
Consolidated statements of changes in stockholders' equity (deficit)

(In thousands, except share amounts)	Series A convertible preferred stock		Series B convertible preferred stock		Common stock		Additional paid-in capital	Accumulated deficit	Treasury stock	Total stockholders' equity (deficit)
	Shares	Amount	Shares	Amount	Shares	Amount				
Balance—January 1, 2017	25,650,000	$ 3	—	$ —	16,458,096	$ —	$ 13,257	$ (18,009)	$ —	$ (4,749)
Repurchase of common stock	—	—	—	—	—	—	—	—	(952)	(952)
Stock option exercises	—	—	—	—	38,705	—	15	—	—	15
Share-based compensation expense	—	—	—	—	—	—	419	—	—	419
Net loss	—	—	—	—	—	—	—	(21,102)	—	(21,102)
Balance—December 31, 2017	25,650,000	$ 3	—	$ —	16,496,801	$ —	$ 13,691	$ (39,111)	$ (952)	$ (26,369)
Issuance of Series B convertible preferred stock, net of offering costs	—	—	21,956,095	2	—	—	109,740	—	—	109,742
Stock option exercises	—	—	—	—	220,316	—	171	—	—	171
Share-based compensation expense	—	—	—	—	—	—	2,492	(39)	—	2,453
Net loss	—	—	—	—	—	—	—	(46,037)	—	(46,037)
Balance—December 31, 2018	25,650,000	$ 3	21,956,095	$ 2	16,717,117	$ —	$ 126,094	$ (85,187)	$ (952)	$ 39,960

See notes to consolidated financial statements

Precision BioSciences, Inc.
Consolidated statements of cash flows

(In thousands)	Years ended December 31, 2017	2018
Cash flows from operating activities:		
Net loss	$ (21,102)	$ (46,037)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	1,435	2,354
Share-based compensation	419	2,453
Loss on disposal of assets	56	14
Impairment of intangible assets	118	—
Changes in operating assets and liabilities:		
Prepaid expenses	(550)	(7,476)
Other current assets	—	(260)
Accounts receivable	—	(523)
Other assets	63	(188)
Accounts payable	864	(673)
Accrued expenses and other current liabilities	707	1,790
Deferred revenue	(6,179)	(3,177)
Net cash used in operating activities	(24,169)	(51,723)
Cash flows from investing activities:		
Acquisition of license rights	—	(1,400)
Purchases of property, equipment, and software	(5,565)	(14,278)
Proceeds from disposal of equipment	50	15
Net cash used in investing activities	(5,515)	(15,663)
Cash flows from financing activities:		
Issuance of Series B convertible preferred stock, net of offering costs	—	109,742
Deferred offering costs	—	(2,136)
Proceeds from stock option exercises	15	171
Repurchases of common stock	(952)	—
Net cash (used in) provided by financing activities	(937)	107,777
Net (decrease) increase in cash and cash equivalents	(30,621)	40,391
Cash and cash equivalents—beginning of period	93,423	62,802
Cash and cash equivalents—end of period	$ 62,802	103,193
Supplemental disclosures of noncash financing and investing activities:		
Deferred offering costs included in accrued expenses and other current liabilities	$ —	$ 406
Property, equipment and software additions included in accounts payable and accrued expenses and other current liabilities	$ 218	$ 1,340

See notes to consolidated financial statements

Precision BioSciences, Inc.
Notes to consolidated financial statements

Note 1: Description of business and summary of significant accounting policies

Description of business and basis of presentation

Precision BioSciences, Inc. (the "Company") was incorporated on January 26, 2006 under the laws of the State of Delaware and is based in Durham, North Carolina. The Company is focused on utilizing its proprietary genome editing platform to help overcome cancers, cure genetic diseases and enable the development of safer, more productive food sources.

The Company's 100% owned subsidiary, Precision PlantSciences, Inc., was incorporated on January 4, 2012. Precision PlantSciences, Inc. amended its certificate of incorporation on January 16, 2018 to change its name to ELO Life Systems, Inc. The accompanying consolidated financial statements include the accounts of the Company and ELO Life Systems, Inc. Intercompany balances and transactions have been eliminated in consolidation.

Since its inception, the Company has devoted substantially all of its efforts to research and development activities, recruiting skilled personnel, developing manufacturing processes, establishing its intellectual property portfolio and providing general and administrative support for these operations. The Company is subject to a number of risks similar to those of other companies conducting high-risk, early-stage research and development of product candidates. Principal among these risks are dependence on key individuals and intellectual property, competition from other products and companies and the technical risks associated with the successful research, development and clinical manufacturing of its and its collaborators' product candidates. The Company's success is dependent upon its ability to continue to raise additional capital in order to fund ongoing research and development, obtain regulatory approval of its products, successfully commercialize its products, generate revenue, meet its obligations and, ultimately, attain profitable operations.

Use of estimates

The preparation of consolidated financial statements in conformity with accounting principles generally accepted in the United States of America ("GAAP") requires management to make estimates and assumptions that affect the amounts reported in the consolidated financial statements and disclosures made in the accompanying notes to the consolidated financial statements. Actual results could differ from those estimates. Significant estimates include recording revenue for multiple element arrangements, determination of the fair value of share-based compensation grants and estimating services expended by third-party service providers used to recognize research and development expense.

Basis of presentation

These financial statements have been prepared in accordance with GAAP. Additionally, the accompanying consolidated financial statements have been prepared on a going concern basis, which contemplates the realization of assets and the satisfaction of liabilities in the normal course of business. To date, the Company has not generated any revenue from product sales and does not expect to generate any revenue from the sale of product in the foreseeable future. During the year ended December 31, 2018, the Company incurred a net loss of $46.0 million and, as of December 31, 2018, has an accumulated deficit of $85.2 million. The Company has financed operations to date primarily through the issuance of preferred stock (see Note 6) and with proceeds from its development and commercial license agreement with Les Laboratoires Servier ("Servier")

Precision BioSciences, Inc.
Notes to consolidated financial statements

(see Note 13). The Company expects to incur additional operating losses and negative operating cash flows for the foreseeable future.

Management believes that existing cash and cash equivalents will allow the Company to continue its operations for at least a year from the issuance date of these consolidated financial statements. In the absence of a significant source of recurring revenue, the continued viability of the Company beyond that point is dependent on its ability to continue to raise additional capital to finance its operations. There can be no assurance that the Company will be able to obtain sufficient capital to cover its costs on acceptable terms, if at all.

Unaudited pro forma consolidated balance sheet

The unaudited pro forma consolidated balance sheet statement presents the Company's capitalization as of December 31, 2018 giving effect to adjustments arising upon the completion of the proposed initial public offering. The adjustments relate to the automatic conversion of all outstanding shares of convertible preferred stock into shares of common stock as if the proposed initial public offering occurred on December 31, 2018.

Cash and cash equivalents

The Company considers all highly liquid investments with an original maturity of three months or less at the date of purchase to be cash equivalents. As of December 31, 2017 and 2018, the Company held cash equivalents composed of money market funds and repurchase agreements that were collateralized by deposits in the form of government securities and obligations.

Concentrations of credit risk

Financial instruments that potentially subject the Company to concentrations of credit risk consist principally of cash and cash equivalents. All of the Company's cash and cash equivalents are held at financial institutions that management believes to be of high credit quality. The Company may maintain cash deposits in financial institutions in excess of government insured limits. The Company regularly invests excess cash deposits in money market funds and repurchase agreements. The Company believes that the credit risk arising from the holdings of these financial instruments is mitigated by the fact that these securities are of short duration, government backed and of high credit rating. The Company has not experienced any losses on cash and cash equivalents to date.

Revenue from two development and license agreements accounted for 89% and 6% of revenue during 2017 and 53% and 34% of revenue during 2018, as well as 97% and 2% of deferred revenue as of December 31, 2018.

Deferred offering costs

The Company capitalizes incremental legal, professional accounting and other third-party fees that are directly associated with the Company's planned initial public offering ("IPO") as other current assets until the IPO is consummated. After consummation of the IPO, these costs will be recorded in stockholders' equity (deficit) as a reduction of additional paid-in capital generated as a result of the offering. If the IPO is not completed, any costs deferred will be expensed immediately.

Precision BioSciences, Inc.
Notes to consolidated financial statements

Property, equipment and software

Property, equipment and software are stated at cost, net of depreciation and amortization. Depreciation and amortization are calculated using the straight-line method over the estimated useful lives of the assets ranging from three to seven years. Leasehold improvements are amortized on a straight-line basis over the shorter of the lease term or estimated useful life of the asset.

The depreciation and amortization periods for the Company's significant property, equipment and software categories are as follows:

Computer hardware and software	3 years
Lab equipment	5 to 7 years
Furniture and office equipment	3 to 5 years
Leasehold improvements	Lesser of remaining lease term or useful life

Repairs and maintenance are charged to operations as incurred, and expenditures for additions and improvements that extend the useful life of the asset are capitalized.

Intangible assets

Intangible assets primarily include licenses and patents. The Company capitalizes license fees paid to acquire access to proprietary technology if the technology is expected to have alternative future use in multiple research and development projects. The cost of licensed technology rights is amortized using the straight-line method over the estimated useful life of the technology. If the access to use the technology rights is one year or less, the cost is recorded as a prepaid expense and amortized over the period identified in the agreement. Amortization expense for licensed technology and capitalized patent costs is included in research and development expenses within the accompanying consolidated statement of operations.

Impairment of long-lived assets

Long-lived assets, such as property, equipment and software and intangible assets, subject to amortization, are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. An impairment loss is assessed when future undiscounted cash flows are less than the assets' carrying value and recognized when the carrying value of the asset exceeds fair value. Fair value is calculated by estimating the undiscounted future cash flows expected to be generated by the asset as well as other valuation techniques. An impairment charge is recognized for the amount by which the carrying amount exceeds the fair value of the asset.

Revenue recognition

The Company's revenues are generated primarily through collaborative research, license, development and commercialization agreements. The terms of these agreements generally contain multiple elements, or deliverables, which may include (i) licenses, or options to obtain licenses, to the Company's technology, (ii) research and development activities to be performed on behalf of the collaborative partner, and (iii) in certain cases, services in connection with the manufacturing of preclinical and clinical material. Payments to the Company under these arrangements typically include one or more of the following: non-refundable, upfront license fees; option exercise fees; funding of research and development efforts; clinical and development, regulatory, and sales milestone payments; and royalties on future product sales.

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Revenue is recognized when all of the following conditions are met: (i) persuasive evidence of an arrangement exists, (ii) delivery has occurred or services have been rendered, (iii) fees are fixed or determinable and (iv) collection of fees is reasonably assured.

The Company analyzes its collaboration arrangements to assess whether they are within the scope of Accounting Standards Codification *808, Collaborative Arrangements* ("ASC 808") to determine whether such arrangements involve joint operating activities performed by parties that are both active participants in the activities and exposed to significant risks and rewards dependent on the commercial success of such activities. This requires the Company to determine whether elements of the collaboration are deemed to be within the scope of ASC 808 and those that are more reflective of a vendor-customer relationship and therefore within the scope of Accounting Standards Codification *605-25, Revenue Recognition—Multiple-Element Arrangements* ("ASC 605"). To date, the Company has no arrangements that are within the scope of ASC 808.

When evaluating multiple element arrangements under ASC 605, the Company determines whether the arrangement should be divided into separate units of accounting and how the arrangement consideration should be measured and allocated among the separate units of accounting. An element qualifies as a separate unit of accounting when the delivered element has stand-alone value to the customer. Any delivered elements that do not qualify as separate units of accounting are combined with other undelivered elements within the arrangement as a single unit of accounting. The Company determines the revenue recognition method for the combined unit of accounting and recognizes the revenue over the period from inception through the date the last deliverable within the single unit of accounting is delivered. The Company's arrangements do not include a general right of return relative to delivered elements.

Cash received prior to satisfying all revenue recognition criteria are recorded as deferred revenue in the accompanying consolidated balance sheets. The Company's deferred revenue primarily includes nonrefundable up-front license fees and advance payments for research and development funding. The deferred revenue is recognized into revenue on a proportional or straight-line basis over the estimated period of the Company's substantive performance obligations or the period the rights granted are in effect. Analyzing the arrangement to identify deliverables requires the use of judgment and each deliverable may be an obligation to deliver services, a right or a license to use an asset or some other performance obligation.

In arrangements that include license rights and other noncontingent deliverables, these deliverables do not have stand-alone value because the noncontingent deliverables are dependent on the license rights, are not sold separately and cannot be resold. In addition, when noncontingent deliverables are sold with up-front license rights, the sale of license rights do not represent the culmination of a separate earnings process. As such, the Company accounts for the license and the noncontingent deliverables as a single unit of accounting. In such instances, the license revenue in the form of nonrefundable up-front payments is deferred and recognized over the applicable relationship period, which historically has been the estimated period of the Company's substantive performance obligations or the period the rights granted are in effect.

The Company will recognize clinical and development, regulatory, and sales milestone payments as revenue when earned if they are substantive and the Company has no ongoing performance obligations related to the milestone payment. A milestone payment is considered substantive if it (i) is commensurate with either the Company's performance to achieve the milestone or the enhanced value of the delivered item as a result of a specific outcome from the Company's performance to achieve the milestone; (ii) relates solely to past performance; and (iii) is reasonable relative to all of the deliverables and payment terms, including other potential milestone consideration, within the arrangement.

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Royalties earned on product sales, if any, are recognized based on contractual terms of the agreement when reported sales are reliably measurable and collectibility is reasonably assured, provided that there are no performance obligations then remaining. To date, none of the Company's product candidates have been approved or commercialized, and therefore, the Company has not earned any royalty revenue from product sales.

In the event that an agreement was to be terminated and the Company had no further performance obligations at that time, the Company would recognize as revenue at the date of such termination any portion of the non-refundable upfront payment and other payments that had not previously been recorded as revenue and were classified as deferred revenue at the date of such termination.

Research and development

Research and development costs are expensed as incurred. Research and development expenses are comprised of costs incurred in performing research and development activities including salaries, benefits, share-based compensation, allocations for rent and facility costs, depreciation, preclinical manufacturing expenses, costs of services provided by contract research organizations ("CROs") in connection with preclinical trials and contract manufacturing organizations ("CMOs") engaged to manufacture clinical trial material, costs of licensing technology, and costs of services provided by research organizations and service providers. Upfront payments and milestone payments made for the licensing of technology are expensed as research and development in the period in which they are incurred if the technology is not expected to have any alternative future uses other than the specific research and development project for which it was intended. Nonrefundable advance payments for goods or services to be received in the future for use in research and development activities are recorded as prepaid expenses. The prepaid amounts are expensed as the related goods are delivered or the services are performed rather than when the payment is made.

The Company is required to estimate accrued research and development expenses resulting from its obligations under contracts with CROs, CMOs, research organizations, service providers, vendors and consultants in connection with research and development activities. The financial terms of these contracts are subject to negotiations and vary from contract to contract and may result in payment flows that do not match the periods over which materials or services are provided to the Company under such contracts. The Company's objective is to reflect the appropriate research and development expenses in its consolidated financial statements by matching those expenses with the period in which the services and efforts are expended. There may be instances in which payments made to the Company's vendors will exceed the level of services provided and result in a prepayment of the expense. In accruing fees, the Company estimates the time period over which services will be performed and the level of effort to be expended in each period. If the actual timing of the performance of services or the level of effort varies from the Company's estimate, the Company adjusts the accrual or amount of prepaid expense accordingly. Accrued amounts are disclosed in Note 5.

Although the Company does not expect its estimates to be materially different from amounts actually incurred, the Company's understanding of the status and timing of services performed relative to the actual status and timing of services performed may vary and may result in the Company reporting amounts that are too high or too low in any particular period. To date, the Company has not made any material adjustments to prior estimates of accrued research and development expenses.

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Common stock valuation

Due to the absence of an active market for the Company's common stock, the Company utilized methodologies in accordance with the framework of the American Institute of Certified Public Accountants Technical Practice Aid, Valuation of Privately-Held Company Equity Securities Issued as Compensation, to estimate the fair value of its common stock. In determining the exercise prices for stock options granted, the Company has considered the estimated fair value of the common stock as of the measurement date. The estimated fair value of the common stock has been determined based upon a variety of factors, including the illiquid nature of the common stock, the Company's financial position and historical financial performance, the status of technological developments within the Company's research, the composition and ability of the current research and management team, an evaluation or benchmark of the Company's competition and the current business climate in the marketplace. Significant changes to the key assumptions underlying the factors used could result in different fair values of common stock at each valuation date.

Comprehensive loss

Comprehensive loss includes net loss as well as other changes in stockholders' equity (deficit) that result from transactions and economic events other than those with stockholders. For the years ended December 31, 2017 and 2018, there was no difference between net loss and comprehensive loss in the accompanying consolidated financial statements.

Net loss per share

Basic net loss per share is computed by dividing net loss attributable to common stockholders by the weighted-average number of shares of common stock outstanding during the period. Diluted net loss per share is computed using the weighted-average number of shares of common stock outstanding during the period and, if dilutive, the weighted-average number of potential shares of common stock. Diluted net loss per share is the same as basic net loss per share for the years ended December 31, 2017 and 2018 since all potential shares of common stock instruments are anti-dilutive as a result of the net loss.

The Company's convertible preferred stock contractually entitles the holders of such shares to participate in dividends but does not contractually require the holders of such shares to participate in losses of the Company. Accordingly, in periods in which the Company reports a net loss, such losses are not allocated to such participating securities. In periods in which the Company reports a net loss attributable to common stockholders, diluted net loss per share attributable to common stockholders is the same as basic net loss per share attributable to common stockholders, since dilutive shares of common stock are not assumed to have been issued if their effect is anti-dilutive. The Company reported a net loss attributable to common stockholders for the years ended December 31, 2017 and 2018.

Share-based compensation

Employees—The Company determines the fair value of stock options issued to employees as of the grant date. Share-based compensation expense equal to the grant-date fair value of the stock options is recognized over the requisite service period, which is equal to the vesting period.

Nonemployees—For nonemployees, the Company determines the fair value of stock options as of the measurement date, which is the earlier of the performance commitment date or the date on which the

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nonemployees' performance is complete. Share-based compensation expense equal to the measurement date fair value of the stock options is recognized over the period services are received.

Income taxes

Deferred tax assets and liabilities are determined based on the temporary differences between the consolidated financial statement carrying amounts and the tax basis of assets and liabilities using the enacted tax rates in effect in the years in which the differences are expected to reverse. In estimating future tax consequences, all expected future events are considered other than the enactment of changes in the tax law or rates. Changes in deferred tax assets and liabilities are recorded in the provision for income taxes.

The Company may recognize the tax benefit from an uncertain tax position only if it is more likely than not that the tax position will be sustained on examination by the taxing authorities based on the technical merits of the position. The tax benefits recognized in the consolidated financial statements from such a position is measured based on the largest benefit that has a greater than 50% likelihood of being realized upon ultimate settlement.

The Company assesses the likelihood that its deferred tax assets will be recovered from future taxable income and, to the extent it believes, based upon the weight of available evidence, that it is more likely than not that all or a portion of the deferred tax assets will not be realized, a valuation allowance is established through a charge to income tax expense. Potential for recovery of deferred tax assets is evaluated by estimating the future taxable profits expected and considering prudent and feasible tax planning strategies.

Recent accounting pronouncements

The Company is an "emerging growth company," as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act, and may take advantage of reduced reporting requirements that are otherwise applicable to public companies. Section 107 of the JOBS Act exempts emerging growth companies from being required to comply with new or revised financial accounting standards until private companies are required to comply with those standards. The Company has elected to use the extended transition period for complying with new or revised accounting standards; and as a result of this election, its financial statements may not be comparable to companies that comply with public company effective dates. The JOBS Act also exempts the Company from having to provide an auditor attestation of internal controls over financial reporting under Sarbanes-Oxley Act Section 404(b).

The Company will remain an "emerging growth company" until the earliest of (i) the last day of the fiscal year in which it has total annual gross revenues of $1.07 billion or more, (ii) the last day of the fiscal year following the fifth anniversary of the completion of its IPO, (iii) the date on which it has issued more than $1.0 billion in nonconvertible debt during the previous three years or (iv) the date on which it is deemed to be a large accelerated filer under the rules of the Securities and Exchange Commission ("SEC"), which generally is when it has more than $700 million in market value of its stock held by non-affiliates, has been a public company for at least 12 months and have filed one annual report on Form 10-K.

In May 2014, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU"), No. 2014-09, Revenue (Topic 606): Revenue from Contracts with Customers ("ASU 2014-09"), which will replace existing revenue recognition standards and significantly expand the disclosure requirements for revenue arrangements. The new standard and the subsequent amendments, which are codified in ASC 606, will be

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effective for the Company beginning on January 1, 2019. The guidance permits two methods of adoption: retrospectively to each prior reporting period presented (the full retrospective method), or retrospectively with the cumulative effect of initially applying the guidance recognized at the date of initial application (the modified retrospective method). The Company currently anticipates adopting the new standard effective January 1, 2019 under the modified retrospective method. The Company has engaged outside advisors and is in the process of evaluating the impact of the adoption of ASC 606 on its consolidated financial statements. The Company will continue to assess the potential impact that ASC 606 may have on its financial position and results of operations as it relates to the Company's February 2016 development and commercial license agreement with Servier and the September 2018 collaboration and license agreement with Gilead Sciences, Inc. ("Gilead") (see Note 13 to the consolidated financial statements). The Company has performed an assessment of revenue recognition under the agreements with Servier, for the up-front payment, certain early-stage nonsubstantive development milestones, less fees to exercise the codevelopment and copromotion option, and with Gilead, for research funding. The Company believes revenue recognition under both agreements may not be materially different under ASC 606 as compared to ASC 605. Further, the Company's assessment of revenue for development milestones that are considered substantive under this agreement is that they be recognized over time when the amount of the milestone can be reasonably estimated without a significant reversal under ASC 606. Any prior assessments made by the Company regarding the impact of ASU 2014-09 are subject to change pending the outcome of the Company's final assessment at the conclusion of the first quarter of 2019.

In February 2016, the FASB issued ASU No. 2016-02, *Leases (Topic 842)*, in order to improve comparability among organizations by recognizing lease assets and liabilities in the consolidated balance sheets for those leases previously classified as operating leases under GAAP. The update requires a lessee to recognize in its consolidated balance sheet a liability to make lease payments and also a right-of-use asset representing its right to use the underlying asset for the lease term. In July 2018, the FASB issued amendments in ASU 2018-11, which provide a transition election to not restate comparative periods for the effects of applying the new standard. This transition election permits entities to change the date of initial application to the beginning of the year of adoption and to recognize the effects of applying the new standard as a cumulative-effect adjustment to the opening balance of retained earnings. The Company currently anticipates adopting the new standard effective January 1, 2019 under the modified retrospective method. ASU 2016-02 is effective for the Company for annual periods beginning after December 15, 2019 and early adoption is permitted. The Company is evaluating the impact of adoption of this standard on the consolidated financial statements.

In March 2016, the FASB issued ASU No. 2016-09, *Compensation—Stock Compensation: Improvements to Employee Share-Based Payment Accounting* ("ASU 2016-09"), which amends ASC 718, *Compensation—Stock Compensation*. The amendments simplify several aspects of the accounting for share-based payment transactions, including the income tax consequences, classification of awards as either equity or liabilities, forfeitures, and classification in the consolidated statements of cash flows. ASU No. 2016-09 was adopted by the Company on January 1, 2018 and the adoption did not have a material impact on the consolidated financial statements. The Company elected to account for the impact of pre-vesting forfeitures as they occur rather than applying an estimated forfeiture rate and to adopt this standard using the modified retrospective adoption method.

In May 2017, the FASB issued ASU No. 2017-09, *Compensation-Stock Compensation*, or ASU 2017-09. The new guidance is an update to ASC 718 and simplifies the modification accounting for share-based payment awards. ASU 2017-09 is effective for annual periods beginning after December 15, 2017. The Company adopted this standard as of January 1, 2018. The adoption of this guidance had no impact on the consolidated financial statements.

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Note 2: Other current assets

Other current assets consisted of the following as of December 31 (in thousands):

	2017	2018
Deferred offering costs	$ —	$ 2,542
Deferred rent asset	70	—
Noncustomer receivables	22	504
Total other current assets	$ 92	$ 3,046

Note 3: Property, equipment and software

Property, equipment and software consisted of the following as of December 31 (in thousands):

	2017	2018
Construction in progress	$ 12	$ 8,600
Leasehold improvements	4,541	5,733
Software	86	278
Laboratory equipment	5,370	10,057
Office equipment	570	839
Furniture and fixtures	751	1,124
Total property, equipment and software	11,330	26,631
Less accumulated depreciation and amortization	3,193	5,484
Property, equipment and software—net	$ 8,137	$21,147

As of December 31, 2018, construction in progress includes $0.6 million related to the construction of additional office and laboratory space at 302 East Pettigrew Street, Durham, North Carolina, $5.4 million related to the construction of additional office and laboratory space at 5 Laboratory Drive, Research Triangle Park, North Carolina, and $2.5 million related to the construction of a cleanroom at 20 TW Alexander Drive, Research Triangle Park, North Carolina.

Depreciation expense, including amortization of leasehold improvements and software, was $1.4 million and $2.3 million for the years ended December 31, 2017 and 2018, respectively. Please refer to Note 9, “Commitments and contingencies,” for further information.

Note 4: Intangible assets

Intangible assets, net, consisted of the following as of December 31 (in thousands):

	2017	2018
License cost	$ 431	$1,831
Less: accumulated amortization	(223)	(247)
Less: impairments	(118)	(118)
Intangible assets, net	$ 90	$1,466

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Amortization expense of the intangible assets was $0.1 million for the years ended December 31, 2017 and 2018.

In September 2018, the Company entered into a license agreement to obtain the rights to intellectual property for the production of biological materials for use in its development programs. The Company paid the licensor a one-time, non-refundable license fee of $1.4 million for rights to a cell line that can be used on up to four product candidates. The intellectual property rights are being amortized on a straight-line basis over 216 months.

Note 5: Accrued expenses and other current liabilities

Accrued expenses and other current liabilities consisted of the following as of December 31 (in thousands):

	2017	2018
Accrued compensation	$ 983	$ 965
Accrued research and development expenses	500	1,569
Accrued property, equipment and software	—	219
Accrued deferred offering costs	—	193
Deferred rent	—	198
Accrued legal fees	23	107
Other	67	170
Total accrued expenses and other current liabilities	$1,573	$3,421

Note 6: Stockholders' equity (deficit)

Capital structure

In April 2015, the Company amended and restated its certificate of incorporation and authorized 125,650,000 shares, of which 100,000,000 shares were designated as $0.000005 par value common stock and 25,650,000 shares were designated as $0.0001 par value Series A preferred stock.

In May 2018, the Company amended and restated its certificate of incorporation and authorized 177,606,100 shares, of which 130,000,000 shares were designated as $0.000005 par value common stock, 25,650,000 shares were designated as $0.0001 par value Series A preferred stock, and 21,956,100 shares were designated as $0.0001 par value Series B preferred stock.

Preferred stock

In 2015, the Company issued 25,650,000 shares of Series A preferred stock for gross proceeds of $25.7 million and incurred stock issuance costs of $0.3 million. The Series A preferred stock shares were sold for $1.00 per share (the "Series A Original Issue Price").

From May 2018 to July 2018, the Company issued 21,956,095 shares of its Series B preferred stock and received approximately $110.0 million in gross proceeds, less $0.3 million in aggregate offering costs. The Series B preferred stock shares were sold for $5.01 per share (the "Series B Original Issue Price", together with the Series A Original Issue Price, the "Original Issue Price").

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The rights and privileges of the Series A and Series B preferred stockholders include the following:

Conversion—Each share of Series A and Series B preferred stock may be converted at any time, at the option of the holder, into shares of common stock. Each share of the Series A and Series B preferred stock will be automatically converted into shares of common stock, at the applicable conversion rate then in effect, upon the closing of the proposed initial public offering.

The conversion rate of the Series A and Series B preferred stock is determined by dividing the Original Issue Price by the conversion price for each series of stock. Each share of Series A and Series B preferred stock is convertible on a one-for-2.134686 basis into common stock.

Voting rights—Preferred stock and common stock vote together as one class on an as-converted basis. Holders are entitled to vote on all matters and shall have the number of votes equal to the number of shares of common stock into which the shares of preferred stock held by such holder are then convertible. The Company cannot perform any of the following actions without a vote of approval from at least 60% of outstanding preferred stockholders: execute a liquidation event, amend the Company's certificate of incorporation in a manner detrimental to Series A and Series B preferred stockholders, create or amend any securities to be senior to the Series A and Series B preferred stockholders, issue or increase the amount of the Company's common stock, or change the size of the board of directors. The Company's board of directors is currently comprised of five directors: two directors designated by the common stockholders, two directors designated by the preferred stock stockholders and one independent director. The Company's current shareholder agreements require the board of directors to have seven members. The remaining two directors, neither of whom may have any affiliation with any class of stockholder, will be designated by the four common and preferred directors.

Dividends—No classes of stock are entitled to receive dividends unless preferred stockholders first receive dividends on outstanding shares in an amount at least equal to the amount of dividends payable to the other classes of stock. The preferred shares do not accrue dividends.

Liquidation—Upon liquidation, dissolution, or winding-up of the Company, Series A and Series B preferred stockholders do not receive a liquidation preference in priority to holders of common stock. Assets available for distribution will be allocated ratably among the preferred, on a fully converted basis, and the common stockholders based on their pro rata holdings.

Redemption—The Series A and Series B preferred stock can only be redeemed at the option of the holder for cash or other assets upon the occurrence of specific events following a "Deemed Liquidation Event" (as defined in the Company's amended and restated certificate of incorporation) involving the sale, transfer, lease or other disposition of all or substantially all of the Company's assets.

A Deemed Liquidation Event that would give rise to a preferred stockholder's right of redemption cannot be triggered without approval of the Company's board of directors, because under applicable legal and contractual requirements, the Company's board of directors is required to approve (i) any closing of the sale, transfer, lease or other disposition, of all or substantially all of the Company's assets, (ii) any consummation of the merger or consolidation of the Company with or into another entity and (iii) the Company's participation in any closing of the transfer (whether by merger, consolidation, or otherwise), in which the Company is a constituent party to a person or group of affiliated persons, of the Company's securities, in which, after such closing, such person or group of affiliated persons would hold a majority of the outstanding voting stock of the Company (or the surviving or acquiring entity).

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The holders of the Series A and Series B preferred stock do not have the ability to control whether the Company will redeem the preferred stock or cause the preferred stock to become redeemable (including through a Deemed Liquidation Event) through representation on the Company's board of directors, voting rights or other rights, and there is no event not solely within the Company's control that contractually could cause the holders of the Series A and Series B preferred stock to obtain such control.

Common stock

In March 2017, the Company's board of directors authorized the repurchase of up to 4,258,663 shares of its common stock at a price of $1.18 per share in a solicited offer to non-employees. The Company accounts for its common stock repurchases as treasury stock under the cost method. In April 2017, the Company repurchased 810,472 shares of common stock at a cost of $1.0 million pursuant to this repurchase program.

Voting, dividend and liquidation rights of the holders of the common stock are subject to and qualified by the rights, powers and preferences of the holders of the preferred stock.

The rights and privileges of the holders of common stock include the following:

Voting—Each holder of outstanding shares of common stock shall be entitled to one vote in respect of each share. The number of authorized shares of common stock may be increased or decreased by the affirmative vote of a majority of the outstanding shares of common stock and preferred stock voting together as a single class.

Dividends—Subject to preferred stockholders' right to receive at least an equal amount of dividends payable to the other classes of stock in the event of a dividend, the holders of common stock shall be entitled to receive dividends out of funds legally available at such times and in such amounts as the Company's board of directors may determine in its sole discretion.

Liquidation—Upon liquidation, dissolution, or winding-up of the Company, the common stockholders are entitled to receive assets available for distribution ratably with the preferred stockholders, on a fully converted basis, based on their pro rata holdings.

Redemption—The common stock is not redeemable at the option of the holder.

Note 7: Stock options

Under the terms of its stock option plans, the Company's board of directors may grant stock options to employees, directors and service providers. The Company issued stock options under the 2006 Stock Incentive Plan ("2006 plan") until April 2015, when the 2015 Stock Incentive Plan ("2015 plan") was adopted. The 2006 plan expired in 2016; there are no remaining shares available to be granted under the 2006 plan. There were 1,558,558 and 1,397,203 stock options outstanding under the 2006 Plan as of December 31, 2017 and 2018, respectively.

Upon adoption of the 2015 plan, there were 5,270,095 shares of common stock reserved for issuance. In May 2018, the Company amended the 2015 plan to increase the number of shares of common stock reserved for issuance to 8,211,980. There were 1,363,315 and 1,576,010 shares of common stock available for future grants under the 2015 plan as of December 31, 2017 and 2018, respectively, and 3,857,467 and 6,366,261 stock options outstanding as of December 31, 2017 and 2018, respectively. The Company's board of directors determines the terms of stock options granted under the 2015 plan, including option exercise prices and vesting.

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The Company recorded $0.4 million and an amount less than $0.1 million in employee and nonemployee share-based compensation expense, respectively, during the year ended December 31, 2017 and $2.4 million and an amount less than $0.1 million in employee and nonemployee share-based compensation expense, respectively, during the year ended December 31, 2018.

Share-based compensation expense related to stock options is included in the following line items in the consolidated statements of operations for the year ended December 31 (in thousands):

	2017	2018
Research and development	$286	$1,817
General and administrative	133	636
	$419	$2,453

Determining the appropriate fair value model and the related assumptions requires judgment. The fair value of each option grant is estimated using a Black-Scholes option-pricing model on the date of grant as follows:

	2017		2018	
	Nonemployees	Employees	Nonemployees	Employees
Estimated dividend yield	0.00%	0.00%	0.00%	0.00%
Weighted-average expected stock price volatility	70.28%	73.35%	68.00%	68.44%
Weighted-average risk-free interest rate	1.75%	1.99%	3.03%	2.95%
Expected life of options (in years)	4.60	6.10	6.09	6.01
Weighted-average fair value per option	$ 0.67	$ 0.77	$ 7.60	$ 7.37

The expected volatility rates are estimated based on the actual volatility of comparable public companies over the expected term. The expected life represents the average time that stock options that vest are expected to be outstanding.

The Company does not have sufficient history of exercising stock options to estimate the expected term of employee stock options and thus continues to calculate expected life based on the midpoint between the vesting date and the contractual term which is in accordance with the simplified method. The expected term for share-based compensation granted to nonemployees is the contractual life. The risk-free rate is based on the United States Treasury yield curve during the expected life of the option.

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The following table summarizes activity in the Company's stock option plans during the years ended December 31, 2017 and 2018:

	Outstanding option shares		Weighted-average exercise price
Balance as of January 1, 2017	4,052,313	$	0.35
Granted	1,764,150		1.18
Exercised	(38,705)		0.41
Forfeited/canceled	(361,733)		0.35
Balance as of December 31, 2017	5,416,025		0.62
Granted	3,160,097		11.66
Exercised	(220,308)		0.78
Forfeited/canceled	(430,987)		2.77
Expired	(161,355)		0.01
Balance as of December 31, 2018	7,763,464	$	5.00

The intrinsic value of options exercised was $27,720 and $2,735,441 during 2017 and 2018, respectively.

The following table summarizes certain information about stock options granted under the stock option plans which are vested or expected to vest as of December 31, 2017 and 2018.

		Number of options	Weighted-average remaining contractual life (in years)		Weighted-average exercise price
2017	Expected to be exercisable	5,277,613	6.96	$	0.61
2017	Currently exercisable	2,607,517	5.06		0.23
2018	Expected to be exercisable	7,763,464	7.50	$	5.00
2018	Currently exercisable	3,418,993	5.37		0.76

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The following table summarizes certain information about stock options outstanding under the stock option plans as of December 31:

	2017		
Exercise price	Number of options outstanding	Weighted-average remaining life	Number of options exercisable
$0.01 — $.02	259,647	2.38	259,647
$0.04	1,298,911	3.38	1,298,911
$0.41	1,617,613	7.65	888,501
$1.20	2,239,854	9.19	160,433
	5,416,025		2,607,492

	2018		
Exercise price	Number of options outstanding	Weighted-average remaining life	Number of options exercisable
$0.01 — $.03	1,397,203	2.49	1,397,203
$0.41	1,440,920	6.65	1,166,591
$1.18 — $1.20	1,846,255	8.24	748,873
$8.99	291,023	9.30	33,376
$10.17	289,408	9.56	5,708
$11.98	2,070,029	9.78	67,193
$13.20	428,626	9.93	—
	7,763,464		3,418,944

There was approximately $1.5 million and $21.6 million of total unrecognized compensation cost related to unvested stock options as of December 31, 2017, and 2018, respectively, which is expected to be recognized over a weighted-average period of 3.03 and 3.50 years, respectively.

Note 8: Retirement plan

In January 2011, the Company established a defined contribution 401(k) retirement savings plan (the “Retirement Plan”) to all full-time employees. Employee contributions to the Retirement Plan can be 100% of annual compensation up to the prescribed annual maximum under the Internal Revenue Code. Administrative fees of less than $0.1 million were paid by the Company for the years ended December 31, 2017 and 2018.

The Retirement Plan includes a discretionary matching employer contribution equal to 100% of participants’ deferral contributions up to a certain percentage amount to be determined by the Company on an annual basis. The Company made contributions of $0.2 million and $0.4 million to the Retirement Plan during the years ended December 31, 2017 and 2018, respectively.

Note 9: Commitments and contingencies

Litigation

The Company is subject to various legal matters and claims in the ordinary course of business. Although the results of legal proceedings and claims cannot be predicted with certainty, in the opinion of management, there

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are currently no such known matters that will have a material effect on the consolidated financial condition, results of operations or cash flows of the Company.

Leases

The Company leases office and laboratory space under long-term operating leases. All the leases provide tenant improvement allowances and rent abatements as incentives for the Company to either enter into the initial lease agreement or expand within an existing premises already under lease. The Company leases office and laboratory space at 302 East Pettigrew Street, Durham, North Carolina, which is the Company's corporate headquarters. The property is leased through July 2024 with the option to extend. The Company leases laboratory and office space at 5 Laboratory Drive, Research Triangle Park, North Carolina. The property is leased through April 2026 with the option to extend. The Company leases laboratory space at 20 TW Alexander Drive, Research Triangle Park, North Carolina. The property is leased through August 2026 with the option to extend.

The following is a schedule of future minimum lease payments for all leases as of December 31, 2018 (in thousands):

	Operating leases
2019	$ 1,999
2020	2,157
2021	2,227
2022	2,299
2023	2,364
2024 and beyond	3,484

Future minimum lease payments due under certain operating lease arrangements contain fixed rent increases over the term of the lease. Rent expense on these operating leases is recognized over the term of the lease on a straight-line basis. The excess of rent expense over lease payments made has been reported in deferred rent and deferred rent-noncurrent in the consolidated balance sheets. Rent expense was $0.8 million and $1.5 million during the years ended December 31, 2017 and 2018, respectively, and apportioned between the "Research and development" and "General and administrative" lines items in the consolidated statements of operations.

Supply agreements

The Company enters into contracts in the ordinary course of business with CMOs for the manufacturing of clinical trial materials. These agreements provide for termination at the request of either party with less than one-year notice and are, therefore, cancelable contracts and, if canceled, are not anticipated to have a material effect on the consolidated financial condition, results of operations or cash flows of the Company.

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Note 10: Net loss per share and unaudited pro forma net loss per share

Net loss per share

Basic and diluted net loss per share attributable to common stockholders was calculated as follows (in thousands, except share and per share amounts):

	Years ended December 31,	
	2017	2018
Numerator:		
Net loss attributable to common stockholders	$ (21,102)	$ (46,037)
Denominator:		
Weighted-average shares of common stock outstanding—basic and diluted	15,906,793	15,775,541
Net loss per share attributable to common stockholders—basic and diluted	$ (1.33)	$ (2.92)

The Company's potential dilutive securities have been excluded from the computation of diluted net loss per share as the effect would be to reduce the net loss per share. Therefore, the weighted-average number of shares of common stock outstanding used to calculate both basic and diluted net loss per share attributable to common stockholders is the same.

The Company excluded the following potential shares of common stock from the computation of diluted net loss per share attributable to common stockholders because including them would have had an anti-dilutive effect:

	Years ended December 31,	
	2017	2018
Series A preferred stock (as converted to common stock)	12,015,818	12,015,814
Series B preferred stock (as converted to common stock)	—	10,285,376
Outstanding stock options converted to common stock	2,759,732	4,796,377
Total	14,775,550	27,097,567

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Unaudited pro forma net loss per share

The unaudited pro forma basic and diluted net loss per share attributable to common stockholders for the year ended December 31, 2018 has been prepared to give effect to adjustments arising upon the completion of the proposed IPO. The unaudited pro forma net loss attributable to common stockholders, as well as basic and diluted weighted-average shares of common stock outstanding, used in the calculation of unaudited pro forma basic and diluted net loss per share attributable to common stockholders gives effect to the automatic conversion of all outstanding shares of convertible preferred stock as of January 1, 2018 into shares of common stock as if the proposed initial public offering had occurred on that date or the issuance date of the convertible preferred stock for issuances after January 1, 2018. Unaudited pro forma basic and diluted net loss per share attributable to common stockholders was calculated as follows (in thousands, except share and per share amounts):

	Year ended December 31, 2018
Numerator:	
Net loss attributable to common stockholders	$ (46,037)
Denominator:	
Weighted-average shares of common stock outstanding—basic and diluted	15,775,541
Pro forma adjustment to reflect automatic conversion of convertible preferred stock to common stock upon the completion of the proposed initial public offering	17,878,294
Pro forma weighted average shares of common stock outstanding—basic and diluted	33,653,835
Pro forma net loss per share attributable to common stockholders—basic and diluted	$ (1.37)

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Note 11: Income taxes

The Company recorded no income tax expense due to the operating losses incurred for the years ended December 31, 2017 and 2018.

Significant components of the Company's deferred tax assets and deferred tax liabilities are as follows as of December 31 (in thousands):

	2017	2018
Noncurrent deferred tax assets:		
Net operating loss carryforwards	$ 4,498	$ 9,185
Contribution carryforwards	10	29
Deferred rent	272	449
Deferred revenue	4,429	9,454
Other assets	102	573
Tax credits	1,697	3,632
Less valuation allowance	(10,464)	(22,736)
Total deferred tax assets, noncurrent	544	586
Noncurrent deferred tax liability:		
Property and equipment	544	586
Total deferred tax liabilities, noncurrent	544	586
Net deferred tax assets	$ —	$ —

As of December 31, 2017 and 2018, the Company has provided a valuation allowance for the full amount of the net deferred tax assets as the realization of the net deferred tax assets is not determined to be more likely than not. The net increase in the valuation allowance for the year ended December 31, 2018 of $12.3 million is comprised of an increase in the valuation allowance recorded against the deferred tax assets, primarily deferred revenue, for the year.

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The reasons for the difference between actual income tax benefit for the years ended December 31, 2017 and 2018 and the amount computed by applying the statutory federal income tax rate to losses before income tax benefit are as follows (dollars in thousands):

	2017		2018	
	Amount	% of pretax earnings	Amount	% of pretax earnings
Income tax expense (benefit) at statutory rate	$ (7,174)	34.0%	$ (9,668)	21.0%
State income taxes, net of federal tax benefit	(417)	2.0%	(909)	2.0%
Non-deductible expenses	208	(1.0%)	270	(0.6%)
Credits	(1,039)	4.9%	(1,934)	4.2%
Change in federal tax rate	4,955	(23.5%)	—	—
Change in state tax rate	2	—	—	—
Current blended state tax rate versus deferred rate	—	—	1	0.0%
Other	(110)	0.5%	(32)	0.1%
Change in valuation allowance	3,575	(16.9%)	12,272	(26.7%)
Income tax (benefit) expense	$ —	0.0%	$ —	0.0%

At December 31, 2017, the Company had federal and state net operating loss (“NOL”) carryforwards of approximately $20.1 million and $19.4 million, respectively. As of December 31, 2018, the Company had federal and state NOL carryforwards of approximately $40.0 million and $39.8 million, respectively. The federal NOL carryforwards of $19.4 million will begin to expire in 2030 while the remaining federal NOL carryforwards of $20.6 million carry forward indefinitely. The state NOL carryforwards begin to expire in 2025. At December 31, 2017, the Company had federal and state research and development (“R&D”) tax credits of $1.7 million and an amount less than $0.1 million which begin to expire in 2027 and 2030, respectively. At December 31, 2018, the Company had federal and state R&D tax credits of $3.6 million and an amount less than $0.1 million, which begin to expire in 2027 and 2030, respectively. At December 31, 2017 and 2018, the Company had federal contribution carryforward amounts of less than $0.1 million and $0.1 million, respectively, which begin to expire in 2020.

The Company incorporated a subsidiary in Australia in 2018. However, the subsidiary has had no activity since inception. As such, the there are no undistributed earnings as of December 31, 2018.

The Company’s ability to utilize its NOL and R&D credit carryforwards may be substantially limited due to ownership changes that may have occurred or that could occur in the future, as required by Section 382 of the Internal Revenue Code of 1986, as amended (the Code), as well as similar state provisions. These ownership changes may limit the amount of NOL and R&D credit carryforwards that can be utilized annually to offset future taxable income and tax, respectively. In general, an “ownership change,” as defined by Section 382 of the Code, results from a transaction or series of transactions over a three-year period resulting in an ownership change of more than 50 percent of the outstanding stock of a company by certain stockholders or public groups. The Company has not completed a study to assess whether one or more ownership changes have occurred since the Company became a loss corporation under the definition of Section 382. If the Company has experienced an ownership change, utilization of the NOL or R&D credit carryforwards would be subject to an annual limitation, which is determined by first multiplying the value of the Company’s stock at the time of the ownership change by the applicable long-term, tax-exempt rate, and then could be subject to additional adjustments, as required. Any such limitation may result in the expiration of a portion of the NOL or R&D credit

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carryforwards before utilization. Until a study is completed and any limitation known, no amounts are being considered as an uncertain tax position or disclosed as an unrecognized tax benefit. Any carryforwards that expire prior to utilization as a result of such limitations will be removed from deferred tax assets with a corresponding reduction of the valuation allowance. Due to the existence of the valuation allowance, it is not expected that any possible limitation will have an impact on the results of operations of the Company.

The Company reflects in the accompanying consolidated financial statements the benefit of positions taken in a previously filed tax return or expected to be taken in a future tax return only if it is considered 'more-likely-than-not' that the position taken will be sustained by the appropriate taxing authority. As of December 31, 2017 and 2018, the Company had no unrecognized income tax benefits. The Company's policy for recording interest and penalties relating to uncertain income tax positions is to record them as a component of income tax expense in the accompanying consolidated statements of operations. As of December 31, 2017 and 2018, the Company had no such accruals.

On December 22, 2017, the Tax Cuts and Jobs Act was enacted into law, which reduced the federal corporate income tax rate to 21% for tax years beginning after December 31, 2017. As a result of the newly enacted tax rate, the Company adjusted its deferred tax assets as of December 31, 2017 by applying the new 21% rate, which resulted in a decrease to the deferred tax assets and a corresponding decrease to the valuation allowance of approximately $5 million for the year ended December 31, 2017.

The SEC staff issued Staff Accounting Bulletin No. 118, Income Tax Accounting Implications of the Tax Cuts and Jobs Act ("SAB 118"), which allows the Company to record provisional amounts during a measurement period which is similar to the measurement period used when accounting for business combinations. The measurement period has ended and the Company's accounting related to the 2017 Tax Cuts and Jobs Act is complete. The Company did not make any measurement-period adjustments related to the provision items recorded as of December 31, 2017.

Note 12: Fair value measurements

The carrying amounts of the Company's financial instruments, including accounts receivable, accounts payable, and accrued expenses and other current liabilities, approximate their respective fair values due to their short-term nature. The Company uses a three-tier fair value hierarchy to classify and disclose all assets and liabilities measured at fair value on a recurring basis and to minimize the use of unobservable inputs when determining their fair value. The three tiers are defined as follows:

Level 1—Observable inputs based on unadjusted quoted prices in active markets for identical assets or liabilities

Level 2—Inputs, other than quoted prices in active markets, that are observable either directly or indirectly

Level 3—Unobservable inputs for which there is little or no market data, which require the Company to develop its own assumptions

The Company classifies investments in money market funds within Level 1 as the prices are available from quoted prices in active markets. Investments in repurchase agreements are classified within Level 2 as these instruments are valued using observable market inputs including reported trades, broker/dealer quotes, bids and/or offers.

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As of December 31, 2017 and 2018, the Company held cash equivalents which is composed of money market funds and repurchase agreements that were purchased through repurchase intermediary banks and collateralized by deposits in the form of government securities and obligations.

The following represents assets measured at fair value on a recurring basis by the Company (in thousands):

December 31, 2017	Fair value	Level 1	Level 2	Level 3
Assets:				
Money market funds	$ 251	$ 251	$ —	$ —
Repurchase agreements	58,345	—	58,345	—
	$ 58,596	$ 251	$58,345	$ —

December 31, 2018	Fair value	Level 1	Level 2	Level 3
Assets:				
Money market funds	$ 781	$ 781	$ —	$ —
Repurchase agreements	94,500	—	94,500	—
	$ 95,281	$ 781	$94,500	$ —

Note 13: Collaboration and license agreements

Development and commercial license agreement with Servier

On February 24, 2016, the Company entered into a development and commercial license agreement, as subsequently amended, with Baxalta (now Shire), which was assigned to Servier in connection with its acquisition of Shire's oncology business in August 2018. This agreement establishes a collaboration between the Company and Servier to develop allogeneic chimeric antigen receptor T cell therapies for up to six unique antigen targets selected by Servier. Servier selected one target at the agreement's inception, and Servier is entitled to select the remaining five targets over the first four years of the agreement. Servier is required to make a milestone payment to the Company upon achievement of an early-stage pre- investigational new drug application ("IND") development milestone event completed for each of the remaining five targets selected, if any. The Company granted Servier a development license and will perform early-stage R&D on the selected targets and develop the resulting therapeutic product candidates through Phase 1 clinical trials and manufacture clinical trial material for use in Phase 2 clinical trials. Also, the Company and Servier have formed a joint steering committee ("JSC") to provide high-level oversight and decision making regarding the activities covered under the agreement.

The Company received an upfront payment of $105.0 million under the agreement. At the Phase 2 readiness stage for any product candidate, Servier may exercise a commercial option, subject to payment of commercial option exercise fees, to proceed with development and commercialization of the product candidate and perform late-stage R&D, including Phase 2 and Phase 3 clinical trials and obtaining regulatory approvals. The Company has the ability to receive total payments, in the aggregate across all six targets that may be selected by Servier, of up to approximately $1.6 billion, including the upfront payment of $105.0 million and up to $1.5 billion in milestone payments, consisting of up to $401.3 million in development milestone payments and up to $1.1 billion in commercial milestone payments. The Company is also entitled to receive tiered royalties ranging from the mid-single digit percentages to the sub-teen percentages on worldwide net sales of any products

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developed, subject to customary potential reductions. The Company also has the right to opt in and participate in the development and commercialization of any products resulting from the collaboration through a 50/50 codevelopment and co-promotion option in the United States. This will require the Company to pay a codevelopment and co-promotion option fee on each licensed product for which the Company elects to participate. This option is exercisable at the Phase 2 readiness stage and only after Servier exercises its commercial option.

The Company has determined that the targets are not separable because they are all based on the ARCUS proprietary genome editing platform and has assumed that Servier will nominate all six targets over the term of the agreement. The Company has concluded that the agreement with Servier contains the following deliverables: (i) a development license; (ii) performance of early-stage R&D services, which includes the early stage pre-IND development milestones that are deemed non-substantive and not subject to milestone method accounting, and (iii) JSC participation. The Company assessed whether any of these deliverables should be considered separate units of accounting and concluded that each of these deliverables has no standalone value other than performing early-stage R&D services on the Company's intellectual property and that the Company does not have a practice of selling its intellectual property or providing early-stage R&D services on a standalone basis to other parties. Also, none of these deliverables have any right of return. As a result, the Company concluded that these deliverables are considered a single unit of accounting.

The Company determined the consideration under the agreement consists of the $105.0 million up-front payment and milestone payments that may be earned for the early-stage pre-IND development milestones for the second through sixth antigen targets, if any, selected by Servier, less payment by the Company to exercise the 50/50 co-development and co-promotion option. The Company intends to opt in and participate on all selected targets with respect to the 50/50 co-development and co-promotion option. The Company can estimate its future cost based on the terms of the agreement. Thus, the option fees payable by the Company are considered an element that reduces the total arrangement consideration. The Company will not allocate consideration to the single unit of accounting to the extent of the total estimated future cost of the 50/50 codevelopment and co-promotion option fees it intends to pay. The total arrangement consideration through Phase 1 clinical trials for the single unit of accounting is recognized as revenue over the estimated performance period of 9.5 years, which includes the period of time Servier has to select the remaining 5 targets for development and the estimated time for the Company to complete early-stage R&D activities on all selected targets.

The Company has evaluated all of the milestones in connection with the agreement to determine if they are substantive and assess whether, for each milestone, (i) the consideration is commensurate with either the Company's performance to achieve the milestone or the enhancement of the value of the delivered item(s) as a result of a specific outcome resulting from the Company's performance to achieve the milestone, (ii) the consideration relates solely to past performance, and (iii) the consideration is reasonable relative to all of the deliverables and payment terms within the agreement. As noted, the early-stage pre-IND development milestones are deemed to be non-substantive and part of the single unit of accounting identified at the agreement's inception.

Because of the substantive uncertainty at the outset of the agreement that the Company will successfully achieve the development and sales milestones or that Servier will exercise its commercial option, the Company has determined that these are contingent deliverables. The manufacture of clinical trial material for use in Phase 2 clinical trials is also considered a contingent deliverable as the need for these materials will only occur

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if Servier exercises its commercial option. These future contingent deliverables do not contain any discounts that require allocation to the total arrangement consideration. As such, the milestones related to the contingent deliverables should not be allocated to the arrangement's consideration at the outset but rather be accounted for pursuant to ASC 605-28, Milestone Method. The contingent deliverables that are considered substantive are (i) the commercial option exercise fees, (ii) the manufacture of Phase 2 clinical trial material, (iii) development milestones based on specified regulatory and sales events, and (iv) sales-based milestones based on the achievement of specified sales amounts. The Company will recognize royalty revenue in the period of sale of the related product(s), based on the underlying contract terms, provided that the reported sales are reliably measurable and the Company has no remaining performance obligations, assuming all other revenue recognition criteria are met.

The Company recognized $5.8 million in revenues during 2017 and 2018 under the agreement with Servier. The amount recorded as deferred revenue was $94.4 and $88.6 million as of December 31, 2017 and 2018, respectively. No development or sales-based milestone payments were received for the years ended December 31, 2017 and 2018.

Sponsored research, collaboration and license agreement with the University of Pennsylvania

On January 1, 2018, the Company entered into a sponsored research, collaboration and license agreement with the University of Pennsylvania ("Penn") to collaborate on the preclinical development of six indications for gene editing products involving the delivery of an ARCUS nuclease. Unless the Company elects to terminate its funding obligations, the Company will provide semi-annual research funding payments of up to $5.0 million, with no minimum funding requirement, for up to a three-year term to fund the cost of the research program as specified in a mutually agreed-upon research budget and be responsible for post-IND enabling study development activities. The research funding payments will be expensed as incurred.

In addition to the research funding payments, if the Company elects to use certain Penn technology, including technology arising out of the collaboration, and achieves certain development and sales milestones, then the Company will be required to make certain development and sales milestone payments totaling up to $16.1 million per product in any one year, assuming the maximum development and sales milestones are met in any one year. An additional $12.3 million per product in sales milestone payments could be payable in other years if other sales thresholds are achieved, thus totaling $28.4 million in aggregate milestone payments per product. In addition to the development and sales milestone payments, low single-digit royalty percentages are also payable on net sales of certain products.

The Company may terminate the agreement by providing written notice at least 60 days prior to the due date of the next semi-annual research funding payment without making termination payments to Penn other than for non-cancelable costs and reasonable wind down costs. If such notice is provided during the research term, the agreement will terminate at the end of the current semi-annual funding period. Following completion or expiration of the three-year research term, the agreement remains in effect for the lifetime of certain patents, and the Company may terminate the agreement upon providing at least 90 days prior written notice.

Penn provided the Company a non-exclusive, worldwide, royalty-bearing license for certain patent rights and know-how to be used on the six indications in a defined field of use involving the delivery and use of an ARCUS nuclease in exchange for an upfront payment of $0.3 million. Once the Company has paid the first $15.0 million in research funding noted above, the license grant for such patent rights and know-how in the field of use will

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be expanded to remove the limitation on indications and the Company may, upon payment of a $1.0 million option fee, obtain a license for certain additional patent rights.

Collaboration and license agreement with Gilead

On September 10, 2018, the Company and Gilead Sciences, Inc. (“Gilead”) entered into a collaboration and license agreement to develop genome editing tools to target viral DNA associated with Hepatitis B. Pursuant to the terms of the agreement, Gilead will receive an exclusive license to exploit the resulting synthetic nucleases and products that use them to treat Hepatitis B in humans (“development license”), and the Company is entitled to receive up to $40.0 million in research funding for early-stage R&D services, paid in semi-annual increments, over an initial three year term and development and commercial milestone payments of up to an aggregate of $445.0 million, consisting of up to $105.0 million in development milestone payments and up to $340.0 million in commercial milestone payments. The Company is also entitled to receive tiered royalties ranging from the high single digit percentages to the mid-teen percentages on worldwide net sales of the products developed through the term of the agreement, subject to customary potential reductions. Gilead is responsible for obtaining regulatory approvals and, upon termination of the collaboration, will assume sole responsibility for the development and commercialization of such gene editing therapies and products. The Company will provide technology transfer of its development know-how prior to Gilead assuming responsibility. Also, the Company and Gilead will negotiate a separate supply agreement for Precision to manufacture specifically identified products for Gilead to use in clinical trials at price based on the Company’s costs. The Company and Gilead will form a joint steering committee (“JSC”) and a joint research and development committee (“JRDC”) that collectively will provide oversight, decision making and implementation guidance regarding the collaboration activities covered under the agreement.

The agreement with Gilead contains the following deliverables: (i) a development license; (ii) performance of early-stage R&D services, including technology transfer services, and (iii) JSC and JRDC participation. The Company assessed whether any of these deliverables should be considered separate units of accounting and concluded that each of these deliverables has no standalone value other than performing early-stage R&D services and that the Company does not have a practice of selling its intellectual property or providing early-stage R&D services on a standalone basis to other parties. None of these deliverables have any right of return. As a result, the Company concluded that these deliverables are considered a single unit of accounting. The Company will recognize revenue for each semi-annual research funding payment received on a straight-line basis over the six-month period the Company performs early-stage R&D services, as Gilead has the right to terminate the agreement at the conclusion of any six-month period. This method of revenue recognition most closely matches the pattern in which revenue is earned, the Company is paid, and obligations are fulfilled by the Company under the agreement.

The Company has evaluated all of the development and commercial milestones in connection with the agreement to determine if they are substantive and assess whether, for each milestone, (i) the consideration is commensurate with either the Company’s performance to achieve the milestone or the enhancement of the value of the delivered item(s) as a result of a specific outcome resulting from the Company’s performance to achieve the milestone, (ii) the consideration relates solely to past performance, and (iii) the consideration is reasonable relative to all of the deliverables and payment terms within the agreement. Because of the substantive uncertainty at the outset of the agreement that the Company will successfully achieve the development and commercial milestones, the Company has determined that these are contingent deliverables. These future contingent deliverables do not contain any discounts that require allocation to the total

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arrangement consideration. As such, the consideration related to the contingent deliverables should not be allocated to the arrangement's consideration at the outset but rather be accounted for pursuant to ASC 605-28, Milestone Method.

The Company recognized $3.7 million in revenues during 2018 under the agreement with Gilead. The amount recorded as deferred revenue was $2.3 million as of December 31, 2018. No development or commercial milestone payments were received for the year ended December 31, 2018.

Note 14: Segment reporting

The Company has developed a genome editing platform and performs related research for human therapeutic and agricultural applications. The Company's Chief Operating Decision Maker ("CODM") evaluates the Company's financial performance based on two reportable segments: Therapeutics and Food. The Therapeutics segment is focused on the development of products in the field of immuno-oncology and of novel products outside immuno-oncology to treat human diseases. The Food segment is focused on applying ARCUS to develop food and nutrition products through collaboration agreements with consumer-facing companies. The CODM reviews segment performance and allocates resources based upon segment revenue and segment operating loss of the Therapeutics and Food reportable segments.

Segment operating loss is derived by deducting operational cash expenditures, net, from GAAP revenue. Operational cash expenditures are cash disbursements made that are directly attributable to the reportable segment (including directly attributable research and development and property, equipment, and software expenditures) plus an allocation of centralized research and development expenditures for early stage research, nuclease development and the purchase of general laboratory supplies. These expenditures are allocated to the segments based on headcount. The reportable segment and centralized research and development operational cash expenditures include cash disbursements for compensation, lab supplies, purchases of property, equipment, and software and procuring services from CROs, CMOs, and research organizations.

Certain cost items are not allocated to the Company's reportable segments. These cost items primarily consist of compensation and general operational expenses associated with the Company's executive, business development, finance, operations, human resources and legal functions. The Company does not allocate non-cash income statement amounts to its reportable segments, such as share based compensation, depreciation and amortization, intangible asset impairment charges and losses on disposal of assets. When reconciling segment operating loss to consolidated loss from operations, the Company makes an adjustment to convert the cash expenditures to the accrual basis to reflect GAAP.

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All segment revenue is earned in the United States and there are no intersegment revenues. Additionally, the Company reports assets on a consolidated basis and does not allocate assets to its reportable segments for purposes of assessing segment performance or allocating resources. Presented below is the financial information with respect to the Company's reportable segments (in thousands):

	Years ended December 31,	
	2017	2018
Revenue:		
Therapeutics	$ 6,064	$ 9,523
Food	420	1,360
Total segment revenue	6,484	10,883
Segment operational cash expenditures:		
Therapeutics	$ 11,062	$ 35,045
Food	1,699	9,125
Total segment operational cash expenditures	12,761	44,170
Allocation of centralized research and development operational cash expenditures:		
Therapeutics	$ 6,948	$ 11,605
Food	1,164	2,901
Total allocation of centralized research and development operational cash expenditures	8,112	14,506
Segment operating loss:		
Therapeutics	$ (11,946)	$ (37,127)
Food	(2,443)	(10,666)
Total segment operating loss	(14,389)	(47,793)
Adjustments to reconcile segment operating loss to consolidated loss from operations:		
Corporate general and administrative cash expenditures	$ (9,117)	$ (15,892)
Interest income received	(872)	(1,875)
Impairment of intangible assets	(118)	—
Depreciation and amortization	(1,435)	(2,354)
Share-based compensation	(419)	(2,453)
Loss on disposal of assets	(56)	(14)
Adjustments to reconcile cash expenditures to GAAP expenses	4,432	22,469
Total consolidated loss from operations	$ (21,974)	$ (47,912)

Note 15: Subsequent events

In August 2018, the Company entered into a letter of intent with a contractor to begin work on the design and construction of a cGMP facility for the manufacturing of the Company's clinical trial material and future commercial product. The cleanroom will be constructed at the 20 TW Alexander Drive, Research Triangle Park, North Carolina site. The letter of intent allowed the contractor to begin work on the earlier design and engineering phases of the project until the parties could execute an agreement. On February 1, 2019, the

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Company completed a binding agreement with the contractor. The cost of the cleanroom is $5.0 million and the estimated completion date is June 2019. The Company may terminate the agreement upon ten days written notice. Construction-in-progress as of December 31, 2018 includes $2.5 million related to the cleanroom.

In March 2019, we sold and issued approximately $39.6 million aggregate principal amount of convertible promissory notes (the “2019 Notes”) in a private placement transaction. The 2019 Notes accrue interest at a rate of 6% per annum and mature on March 1, 2021, if not previously converted to common stock or preferred stock or repaid in cash prior to the maturity date.

The 2019 Notes will be automatically settled into shares of the Company’s common stock in connection with the closing of an IPO by the Company with gross proceeds of at least $50.0 million at a settlement price equal to the lesser of (i) 85% of the IPO price per share or (ii) a price per share equal to $800.0 million divided by the Company’s fully diluted capitalization as of immediately prior to the closing of such offering. If the gross proceeds of the IPO are less than $50.0 million, the holder of each note may elect to convert the then-outstanding principal and accrued interest into shares of the Company’s common stock equal to 85% of the IPO price per share. If the Company completes a preferred stock financing round with gross proceeds of at least $50.0 million, excluding the conversion of the 2019 Notes, the 2019 Notes will be automatically converted into preferred stock at a settlement price equal to 85% of the lowest per share cash purchase price of preferred stock sold in the financing round.

If the Company sells all or substantially all of its assets, completes a merger or consolidation or transfers a majority of outstanding voting stock that results in a change of control or otherwise liquidates or dissolves (each, a “liquidation event”), the holder will receive 200% of the then-outstanding principal amount. If neither an IPO, nor a qualified preferred stock financing, nor a liquidation event occurs prior to the maturity date, at any time on or after the maturity date, each holder of a 2019 Notes may elect to convert such holder’s 2019 Note into shares of newly authorized Series B-1 Preferred Stock of the Company at a settlement price per share that would be determined based on the then-outstanding principal and accrued interest divided by $6.40 per share, subject to certain recapitalization adjustments.

On March 15, 2019, the Company filed an amendment to the Company’s amended and restated certificate of incorporation to effect a reverse split of shares of the Company’s common stock on a 1-for-2.134686 basis (the “Reverse Stock Split”). In connection with the Reverse Stock Split, the conversion ratio for the Company’s Series A and Series B convertible preferred stock was proportionately adjusted such that the common stock issuable upon conversion of such preferred stock was decreased in proportion to the Reverse Stock Split. Accordingly, all share and per share amounts for all periods presented in these financial statements have been retroactively adjusted, to reflect this reverse stock split and adjustment of the preferred stock conversion ratios.

The Company has evaluated subsequent events through March 18, 2019, the date these consolidated financial statements were issued and has determined that there were no events which have occurred that would require adjustment to or disclosure in these consolidated financial statements other than those disclosed above.

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7,900,000 shares

Common stock

Prospectus

J.P. Morgan **Goldman Sachs & Co. LLC** **Jefferies** **Barclays**

, 2019

Part II
Information not required in prospectus

Item 13. Other expenses of issuance and distribution.

The following table indicates the expenses to be incurred in connection with the offering described in this registration statement, other than underwriting discounts and commissions, all of which will be paid by us. All amounts are estimated except the Securities and Exchange Commission registration fee, the Financial Industry Regulatory Authority, Inc., or FINRA, filing fee and the Nasdaq listing fee.

	Amount
Securities and Exchange Commission registration fee	$ 18,719
FINRA filing fee	15,500
Nasdaq initial listing fee	170,000
Legal fees and expenses	2,925,000
Accounting fees and expenses	939,716
Blue sky fees and expenses	5,000
Printing and engraving expenses	180,000
Transfer agent fees and expenses	5,000
Miscellaneous	41,065
Total expenses	$ 4,300,000

Item 14. Indemnification of directors and officers.

Section 102 of the General Corporation Law of the State of Delaware permits a corporation to eliminate the personal liability of directors of a corporation to the corporation or its stockholders for monetary damages for a breach of fiduciary duty as a director, except where the director breached his or her duty of loyalty, failed to act in good faith, engaged in intentional misconduct or knowingly violated a law, authorized the payment of a dividend or approved a stock repurchase in violation of the General Corporation Law of the State of Delaware or obtained an improper personal benefit. Our amended and restated certificate of incorporation will provide that none of our directors shall be personally liable to us or to our stockholders for monetary damages for any breach of fiduciary duty as a director, notwithstanding any provision of law imposing such liability, except to the extent that the General Corporation Law of the State of Delaware prohibits the elimination or limitation of liability of directors for breaches of fiduciary duty.

Section 145 of the General Corporation Law of the State of Delaware provides that a corporation has the power to indemnify a director, officer, employee or agent of the corporation, or a person serving at the request of the corporation for another corporation, partnership, joint venture, trust or other enterprise in related capacities, against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by the person in connection with an action, suit or proceeding to which he or she was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding by reason of such position, if such person acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the corporation and, in any criminal action or proceeding, had no reasonable cause to believe his or her conduct was unlawful, except that, in the case of actions brought by or in the right of the corporation, no indemnification shall be made with respect to any claim, issue or matter as to which such person shall have been adjudged to be liable to the corporation unless and only to the extent that the Court of Chancery or other adjudicating court determines that, despite the adjudication of liability but in

view of all of the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses which the Court of Chancery or such other court shall deem proper.

Our amended and restated bylaws will provide that we will indemnify each person who was or is a party or threatened to be made a party to any threatened, pending or completed action, suit or proceeding (other than an action by or in the right of our company) by reason of the fact that he or she is or was, or has agreed to become, a director or officer, or is or was serving, or has agreed to serve, at our request as a director, officer, partner, employee or trustee of, or in a similar capacity with, another corporation, partnership, joint venture, trust or other enterprise (all such persons being referred to as an "Indemnitee"), or by reason of any action alleged to have been taken or omitted in such capacity, against all expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred in connection with such action, suit or proceeding and any appeal therefrom, if such Indemnitee acted in good faith and in a manner he or she reasonably believed to be in, or not opposed to, our best interests, and, with respect to any criminal action or proceeding, he or she had no reasonable cause to believe his or her conduct was unlawful. Our amended and restated certificate of incorporation and amended and restated bylaws will provide that we will indemnify any Indemnitee who was or is a party to an action or suit by or in the right of our company to procure a judgment in our favor by reason of the fact that the Indemnitee is or was, or has agreed to become, a director or officer, or is or was serving, or has agreed to serve, at our request as a director, officer, partner, employee or trustee of, or in a similar capacity with, another corporation, partnership, joint venture, trust or other enterprise, or by reason of any action alleged to have been taken or omitted in such capacity, against all expenses (including attorneys' fees) and, to the extent permitted by law, amounts paid in settlement actually and reasonably incurred in connection with such action, suit or proceeding, and any appeal therefrom, if the Indemnitee acted in good faith and in a manner he or she reasonably believed to be in, or not opposed to, our best interests, except that no indemnification shall be made with respect to any claim, issue or matter as to which such person shall have been adjudged to be liable to us, unless a court determines that, despite such adjudication but in view of all of the circumstances, he or she is entitled to indemnification of such expenses. Notwithstanding the foregoing, to the extent that any Indemnitee has been successful, on the merits or otherwise, he or she will be indemnified by us against all expenses (including attorneys' fees) actually and reasonably incurred in connection therewith. Expenses must be advanced to an Indemnitee under certain circumstances.

We have entered into indemnification agreements with each of our directors and executive officers. These indemnification agreements may require us, among other things, to indemnify our directors and executive officers for expenses, including attorneys' fees, judgments, fines and settlement amounts, incurred by a director or executive officer in any action or proceeding arising out of his or her service as one of our directors or executive officers, or any of our subsidiaries or any other company or enterprise to which the person provides services at our request.

We maintain a general liability insurance policy that covers certain liabilities of directors and officers of our corporation arising out of claims based on acts or omissions in their capacities as directors or officers.

In any underwriting agreement we enter into in connection with the sale of common stock being registered hereby, the underwriters will agree to indemnify, under certain conditions, us, our directors, our officers and persons who control us within the meaning of the Securities Act of 1933, as amended, or the Securities Act, against certain liabilities.

Item 15. Recent sales of unregistered securities.

Set forth below is information regarding shares of capital stock issued by us within the past three years. Also included is the consideration received by us for such shares and information relating to the section of the

Securities Act, or rule of the Securities and Exchange Commission, under which exemption from registration was claimed.

(a) Issuances of Capital Stock and Securities Convertible into Capital Stock.

From May 2018 to July 2018, we issued 21,956,095 shares of Series B Preferred Stock to certain accredited investors at a price of $5.01 per share for aggregate proceeds of approximately $110.0 million.

In March 2019, we entered into a note purchase agreement with certain individual and institutional accredited investors, pursuant to which we sold and issued, or agreed to sell and issue, approximately $39.6 million aggregate principal amount of convertible promissory notes in exchange for aggregate cash proceeds of approximately $39.6 million.

(b) Equity Grants and Issuances under Stock Incentive Plans.

Since January 1, 2016, we have granted stock option and restricted stock awards to purchase an aggregate of 6,109,406 shares of our common stock to employees, consultants and directors under our 2015 Stock Incentive Plan with exercise or purchase prices ranging between $0.41 and $13.80 per share, and we have issued 398,423 shares of restricted common stock to employees, consultants and directors under our 2015 Stock Incentive Plan. In addition, since January 1, 2016, we have also issued 319,904 shares of restricted common stock to employees, consultants and directors in connection with the exercise of stock options granted under our 2006 Stock Incentive Plan.

The issuances of the above securities were deemed to be exempt from registration under the Securities Act in reliance upon Section 4(a)(2) of the Securities Act or Regulation D promulgated thereunder, or Rule 701 promulgated under Section 3(b) of the Securities Act, as transactions by an issuer not involving any public offering or pursuant to benefit plans and contracts relating to compensation as provided under Rule 701. Individuals who purchased securities as described above represented their intention to acquire the securities for investment only and not with a view to or for sale in connection with any distribution thereof, and appropriate legends were affixed to the share certificates issued in such transactions.

None of the foregoing transactions involved any underwriters, underwriting discounts or commissions or any public offering.

Item 16. Exhibits and financial statement schedules.

(a) Exhibits.

Exhibit number	Description
1.1	Form of Underwriting Agreement
3.1**	Amended and Restated Certificate of Incorporation of the Registrant, as currently in effect
3.2	Form of Amended and Restated Certificate of Incorporation of the Registrant, to be effective upon the closing of this offering
3.3**	Amended and Restated By-laws of the Registrant, as currently in effect
3.4	Form of Amended and Restated Bylaws of the Registrant, to be effective upon the closing of this offering
3.5	Certificate of Amendment to Third Amended and Restated Certificate of Incorporation of Precision BioSciences, Inc., dated March 15, 2019
4.1	Specimen Common Stock Certificate

Exhibit number	Description
4.2	Amended and Restated Investors' Rights Agreement among the Registrant and certain of its stockholders and the holders of the 2019 Notes, dated May 25, 2018, as amended
5.1	Opinion of Smith, Anderson, Blount, Dorsett, Mitchell & Jernigan, LLP
10.1†**	Development and Commercial License Agreement by and between Les Laboratoires Servier and the Registrant, dated February 24, 2016, as amended
10.2†**	License Agreement by and between Duke University and the Registrant, dated April 17, 2006, as amended
10.3†**	Patent Cross-License Agreement by and between Cellectis SA and the Registrant, dated January 23, 2014
10.4†**	Collaboration and License Agreement by and between Gilead Sciences, Inc. and the Registrant, dated September 10, 2018
10.5	Lease Agreement between the Registrant and VC Owner, dated April 5, 2010, as amended
10.6**	Lease Agreement between Elo Life Systems, Inc. and ARE-NC Region No. 17, LLC, dated March 29, 2018, as amended
10.7**	Lease Agreement between Registrant and Durham TW Alexander, LLC, dated October 2, 2018
10.8**	2006 Stock Incentive Plan, as amended, and form of award agreements thereunder
10.9**	2015 Stock Incentive Plan, as amended, and form of award agreements thereunder
10.10	2019 Incentive Award Plan, and form of award agreements thereunder
10.11	2019 Employee Stock Purchase Plan
10.12	Employment Agreement between the Registrant and Matthew Kane, dated February 27, 2019
10.13	Employment Agreement between the Registrant and Derek Jantz, dated February 27, 2019
10.14	Employment Agreement between the Registrant and Abid Ansari, dated February 27, 2019
10.15	Employment Agreement between the Registrant and David Thomson, dated February 27, 2019
10.16	Employment Agreement between the Registrant and Fayaz Khazi, dated February 27, 2019
10.17	Form of Indemnification Agreement between the Registrant and its directors and officers
10.18	Non-Employee Director Compensation Plan
21.1**	Subsidiaries of the Registrant
23.1	Consent of Deloitte & Touche LLP
23.2	Consent of Smith, Anderson, Blount, Dorsett, Mitchell & Jernigan, LLP (included as part of Exhibit 5.1)
24.1**	Power of Attorney (included on signature page)

** Previously filed.

† Portions of this exhibit (indicated by asterisks) have been omitted pursuant to a request for confidential treatment pursuant to Rule 406 under the Securities Act of 1933, as amended, and have been filed separately with the Securities and Exchange Commission.

(b) Financial Statement Schedules. Schedules not listed above have been omitted because the information required to be set forth therein is not applicable or is shown in the consolidated financial statements or notes thereto.

Item 17. Undertakings.

The undersigned registrant hereby undertakes to provide to the underwriter, at the closing specified in the underwriting agreement, certificates in such denominations and registered in such names as required by the underwriter to permit prompt delivery to each purchaser.

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

The undersigned hereby undertakes that:

(1) For purposes of determining any liability under the Securities Act, the information omitted from the form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in a form of prospectus filed by the registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act shall be deemed to be part of this registration statement as of the time it was declared effective.

(2) For the purpose of determining any liability under the Securities Act, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

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Signatures

Pursuant to the requirements of the Securities Act of 1933, the registrant has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Durham, State of North Carolina, on this 18th day of March, 2019.

PRECISION BIOSCIENCES, INC.
(Registrant)

By: /s/ Matthew Kane
Matthew Kane
President and Chief Executive Officer

Pursuant to the requirements of the Securities Act of 1933, this registration statement has been signed by the following persons in the capacities indicated.

Signature	Title	Date
/s/ Matthew Kane Matthew Kane	President, Chief Executive Officer and Director *(Principal Executive Officer)*	March 18, 2019
/s/ Abid Ansari Abid Ansari	Chief Financial Officer *(Principal Financial and Accounting Officer)*	March 18, 2019
* Robert Adelman, M.D.	Director	March 18, 2019
* Derek Jantz, Ph.D.	Director	March 18, 2019
* Raymond Schinazi, Ph.D.	Director	March 18, 2019
* Shalini Sharp	Director	March 18, 2019
* Tony Yao, M.D., Ph.D.	Director	March 18, 2019

*By: /s/ Abid Ansari
Attorney-in-fact

Exhibit 1.1

Precision BioSciences, Inc.
Common Stock

Underwriting Agreement

, 2019

J.P. Morgan Securities LLC
Goldman Sachs & Co. LLC
Jefferies LLC
Barclays Capital Inc.

As Representatives of the
several Underwriters listed
in Schedule 1 hereto

c/o J. P. Morgan Securities LLC
383 Madison Avenue
New York, NY 10179

c/o Goldman Sachs & Co. LLC
200 West Street
New York, NY 10282

c/o Jefferies LLC
520 Madison Avenue
New York, NY 10022

c/o Barclays Capital Inc.
745 Seventh Avenue
New York, NY 10019

Ladies and Gentlemen:

Precision BioSciences, Inc., a Delaware corporation (the "Company"), proposes to issue and sell to the several underwriters listed in Schedule 1 hereto (the "Underwriters"), for whom you are acting as representatives (the "Representatives"), an aggregate of [●] shares of common stock, par value $0.000005 per share ("Common Stock"), of the Company (the "Underwritten Shares") and, at the option of the Underwriters, up to an additional [●] shares of Common Stock of the Company (the "Option Shares"). The Underwritten Shares and the Option Shares are herein referred to as the "Shares". The shares of Common Stock of the Company to be outstanding after giving effect to the sale of the Shares are referred to herein as the "Stock".

The Company hereby confirms its agreement with the several Underwriters concerning the purchase and sale of the Shares, as follows:

1. Registration Statement. The Company has prepared and filed with the Securities and Exchange Commission (the "Commission") under the Securities Act of 1933, as amended, and the rules and regulations of the Commission thereunder (collectively, the "Securities Act"), a registration statement on Form S-1 (File No. 333-230034), including a prospectus, relating to the Shares. Such registration statement, as amended at the time it became effective, including the information, if any, deemed pursuant

to Rule 430A, 430B or 430C under the Securities Act to be part of the registration statement at the time of its effectiveness ("Rule 430 Information"), is referred to herein as the "Registration Statement"; and as used herein, the term "Preliminary Prospectus" means each prospectus included in such registration statement (and any amendments thereto) before effectiveness, any prospectus filed with the Commission pursuant to Rule 424(a) under the Securities Act and the prospectus included in the Registration Statement at the time of its effectiveness that omits Rule 430 Information, and the term "Prospectus" means the prospectus in the form first used (or made available upon request of purchasers pursuant to Rule 173 under the Securities Act) in connection with confirmation of sales of the Shares. If the Company has filed an abbreviated registration statement pursuant to Rule 462(b) under the Securities Act (the "Rule 462 Registration Statement"), then any reference herein to the term "Registration Statement" shall be deemed to include such Rule 462 Registration Statement. Capitalized terms used but not defined herein shall have the meanings given to such terms in the Registration Statement and the Prospectus.

At or prior to the Applicable Time (as defined below), the Company had prepared the following information (collectively with the pricing information set forth on Annex A, the "Pricing Disclosure Package"): a Preliminary Prospectus dated [●], 2019 and each "free-writing prospectus" (as defined pursuant to Rule 405 under the Securities Act) listed on Annex A hereto.

"Applicable Time" means [●] [A/P].M., New York City time, on [●], 2019.

2. Purchase of the Shares by the Underwriters.

(a) The Company agrees to issue and sell the Underwritten Shares to the several Underwriters as provided in this underwriting agreement (this "Agreement"), and each Underwriter, on the basis of the representations, warranties and agreements set forth herein and subject to the conditions set forth herein, agrees, severally and not jointly, to purchase at a price per share of $[●] (the "Purchase Price") from the Company the respective number of Underwritten Shares set forth opposite such Underwriter's name in Schedule 1 hereto.

In addition, the Company agrees to issue and sell the Option Shares to the several Underwriters as provided in this Agreement, and the Underwriters, on the basis of the representations, warranties and agreements set forth herein and subject to the conditions set forth herein, shall have the option to purchase, severally and not jointly, from the Company the Option Shares at the Purchase Price less an amount per share equal to any dividends or distributions declared by the Company and payable on the Underwritten Shares but not payable on the Option Shares.

If any Option Shares are to be purchased, the number of Option Shares to be purchased by each Underwriter shall be the number of Option Shares which bears the same ratio to the aggregate number of Option Shares being purchased as the number of Underwritten Shares set forth opposite the name of such Underwriter in Schedule 1 hereto (or such number increased as set forth in Section 10 hereof) bears to the aggregate number of Underwritten Shares being purchased from the Company by the several Underwriters, subject, however, to such adjustments to eliminate any fractional Shares as the Representatives in their sole discretion shall make.

The Underwriters may exercise the option to purchase Option Shares at any time in whole, or from time to time in part, on or before the thirtieth day following the date of the Prospectus, by written notice from the Representatives to the Company. Such notice shall set forth the aggregate number of Option Shares as to which the option is being exercised and the date and time when the Option Shares are to be delivered and paid for, which may be the same date and time as the Closing Date (as hereinafter defined)

but shall not be earlier than the Closing Date nor later than the tenth full business day (as hereinafter defined) after the date of such notice (unless such time and date are postponed in accordance with the provisions of Section 10 hereof). Any such notice shall be given at least two business days prior to the date and time of delivery specified therein.

(b) The Company understands that the Underwriters intend to make a public offering of the Shares, and initially to offer the Shares on the terms set forth in the Pricing Disclosure Package. The Company acknowledges and agrees that the Underwriters may offer and sell Shares to or through any affiliate of an Underwriter.

(c) Payment for the Shares shall be made by wire transfer in immediately available funds to the account specified by the Company to the Representatives in the case of the Underwritten Shares, at the offices of Cooley LLP, counsel for the Underwriters, at 1114 Avenue of the Americas, New York, New York 10036, at [●] A.M., New York City time, on [●], 2019, or at such other time or place on the same or such other date, not later than the fifth business day thereafter, as the Representatives and the Company may agree upon in writing or, in the case of the Option Shares, on the date and at the time and place specified by the Representatives in the written notice of the Underwriters' election to purchase such Option Shares. The time and date of such payment for the Underwritten Shares is referred to herein as the "Closing Date", and the time and date for such payment for the Option Shares, if other than the Closing Date, is herein referred to as the "Additional Closing Date".

(d) Payment for the Shares to be purchased on the Closing Date or the Additional Closing Date, as the case may be, shall be made against delivery to the Representatives for the respective accounts of the several Underwriters of the Shares to be purchased on such date or the Additional Closing Date, as the case may be, with any transfer taxes payable in connection with the sale of such Shares duly paid by the Company. Delivery of the Shares shall be made through the facilities of The Depository Trust Company unless the Representatives shall otherwise instruct.

(e) The Company acknowledges and agrees that the Representatives and the other Underwriters are acting solely in the capacity of an arm's length contractual counterparty to the Company with respect to the offering of Shares contemplated hereby (including in connection with determining the terms of the offering) and not as a financial advisor or a fiduciary to, or an agent of, the Company or any other person. Additionally, neither the Representatives nor any other Underwriter is advising the Company or any other person as to any legal, tax, investment, accounting or regulatory matters in any jurisdiction. The Company shall consult with its own advisors concerning such matters and shall be responsible for making its own independent investigation and appraisal of the transactions contemplated hereby, and neither the Representatives nor the other Underwriters shall have any responsibility or liability to the Company with respect thereto. Any review by the Representatives and the other Underwriters of the Company, the transactions contemplated hereby or other matters relating to such transactions will be performed solely for the benefit of the Underwriters and shall not be on behalf of the Company.

3. Representations and Warranties of the Company. The Company represents and warrants to each Underwriter that:

(a) *Preliminary Prospectus.* No order preventing or suspending the use of any Preliminary Prospectus has been issued by the Commission, and each Preliminary Prospectus included in the Pricing Disclosure Package, at the time of filing thereof, complied in all material respects with the Securities Act, and no Preliminary Prospectus, at the time of filing thereof,

contained any untrue statement of a material fact or omitted to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided that the Company makes no representation or warranty with respect to any statements or omissions made in reliance upon and in conformity with information relating to any Underwriter furnished to the Company in writing by such Underwriter through the Representatives expressly for use in any Preliminary Prospectus, it being understood and agreed that the only such information furnished by any Underwriter consists of the information described as such in Section 7(b) hereof.

(b) *Pricing Disclosure Package*. The Pricing Disclosure Package as of the Applicable Time did not, and as of the Closing Date and as of the Additional Closing Date, as the case may be, will not, contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided that the Company makes no representation or warranty with respect to any statements or omissions made in reliance upon and in conformity with information relating to any Underwriter furnished to the Company in writing by such Underwriter through the Representatives expressly for use in such Pricing Disclosure Package, it being understood and agreed that the only such information furnished by any Underwriter consists of the information described as such in Section 7(b) hereof. No statement of material fact included in the Prospectus has been omitted from the Pricing Disclosure Package and no statement of material fact included in the Pricing Disclosure Package that is required to be included in the Prospectus has been omitted therefrom.

(c) *Issuer Free Writing Prospectus.* Other than the Registration Statement, the Preliminary Prospectus and the Prospectus, the Company (including its agents and representatives, other than the Underwriters in their capacity as such) has not prepared, made, used, authorized, approved or referred to and will not prepare, make, use, authorize, approve or refer to any "written communication" (as defined in Rule 405 under the Securities Act) that constitutes an offer to sell or solicitation of an offer to buy the Shares (each such communication by the Company or its agents and representatives (other than a communication referred to in clause (i) below) an "Issuer Free Writing Prospectus") other than (i) any document not constituting a prospectus pursuant to Section 2(a)(10)(a) of the Securities Act or Rule 134 under the Securities Act or (ii) the documents listed on Annex A hereto, each electronic road show and any other written communications approved in writing in advance by the Representatives. Each such Issuer Free Writing Prospectus complies in all material respects with the Securities Act, has been or will be (within the time period specified in Rule 433) filed in accordance with the Securities Act (to the extent required thereby) and does not conflict with the information contained in the Registration Statement or the Pricing Disclosure Package, and, when taken together with the Preliminary Prospectus accompanying, or delivered prior to delivery of, such Issuer Free Writing Prospectus, did not, and as of the Closing Date and as of the Additional Closing Date, as the case may be, will not, contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided that the Company makes no representation or warranty with respect to any statements or omissions made in each such Issuer Free Writing Prospectus or Preliminary Prospectus in reliance upon and in conformity with information relating to any Underwriter furnished to the Company in writing by such Underwriter through the Representatives expressly for use in such Issuer Free Writing Prospectus or Preliminary Prospectus, it being understood and agreed that the only such information furnished by any Underwriter consists of the information described as such in Section 7(b) hereof.

(d) *Emerging Growth Company*. From the time of initial confidential submission of the Registration Statement to the Commission (or, if earlier, the first date on which the Company engaged directly or through any person authorized to act on its behalf in any Testing-the-Waters Communication) through the date hereof, the Company has been and is an "emerging growth company," as defined in Section 2(a) of the Securities Act (an "Emerging Growth Company"). "Testing-the-Waters Communication" means any oral or written communication with potential investors undertaken in reliance on Section 5(d) of the Securities Act.

(e) *Testing-the-Waters Materials.* The Company (i) has not alone engaged in any Testing-the-Waters Communications other than Testing-the-Waters Communications with the consent of the Representatives with entities that are qualified institutional buyers within the meaning of Rule 144A under the Securities Act or institutions that are accredited investors within the meaning of Rule 501 under the Securities Act and (ii) has not authorized anyone other than the Representatives to engage in Testing-the-Waters Communications. The Company reconfirms that the Representatives have been authorized to act on its behalf in undertaking Testing-the-Waters Communications by virtue of a writing substantially in the form of Exhibit D hereto. The Company has not distributed or approved for distribution any Written Testing-the-Waters Communications other than those listed on Annex C hereto. "Written Testing-the-Waters Communication" means any Testing-the-Waters Communication that is a written communication within the meaning of Rule 405 under the Securities Act. Any individual Written Testing-the-Waters Communication does not conflict with the information contained in the Registration Statement or the Pricing Disclosure Package, complied in all material respects with the Securities Act, and when taken together with the Pricing Disclosure Package as of the Applicable Time, did not, and as of the Closing Date and as of the Additional Closing Date, as the case may be, will not, contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading.

(f) *Registration Statement and Prospectus.* The Registration Statement has been declared effective by the Commission. No order suspending the effectiveness of the Registration Statement has been issued by the Commission, and no proceeding for that purpose or pursuant to Section 8A of the Securities Act against the Company or related to the offering of the Shares has been initiated or, to the knowledge of the Company, threatened by the Commission; as of the applicable effective date of the Registration Statement and any post-effective amendment thereto, the Registration Statement and any such post-effective amendment complied and will comply in all material respects with the Securities Act, and did not and will not contain any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary in order to make the statements therein not misleading; and as of the date of the Prospectus and any amendment or supplement thereto and as of the Closing Date and as of the Additional Closing Date, as the case may be, the Prospectus complied and will comply in all material respects with the Securities Act and will not contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided that the Company makes no representation and warranty with respect to any statements or omissions made in reliance upon and in conformity with information relating to any Underwriter furnished to the Company in writing by such Underwriter through the Representatives expressly for use in the Registration Statement and the Prospectus and any amendment or supplement thereto, it being understood and agreed that the only such information furnished by any Underwriter consists of the information described as such in Section 7(b) hereof.

(g) *Financial Statements.* The financial statements (including the related notes thereto) of the Company and its consolidated subsidiaries included in the Registration Statement, the Pricing Disclosure Package and the Prospectus comply in all material respects with the applicable requirements of the Securities Act and present fairly in all material respects the financial position of the Company and its consolidated subsidiaries as of the dates indicated and the results of their operations and the changes in their cash flows for the periods specified; such financial statements have been prepared in conformity with generally accepted accounting principles in the United States ("GAAP") applied on a consistent basis throughout the periods covered thereby, except in the case of unaudited financial statements, which are subject to normal year-end adjustments and do not contain certain footnotes as permitted by the applicable rules of the Commission; and any supporting schedules included in the Registration Statement present fairly in all material respects the information required to be stated therein; and the other financial information included in the Registration Statement, the Pricing Disclosure Package and the Prospectus has been derived from the accounting records of the Company and its consolidated subsidiaries and presents fairly in all material respects the information shown thereby; all disclosures included in the Registration Statement, the Pricing Disclosure Package and the Prospectus regarding "non-GAAP financial measures" (as such term is defined by the rules and regulations of the Commission) comply in all material respects with Regulation G of the Exchange Act and Item 10 of Regulation S-K of the Securities Act, to the extent applicable.

(h) *No Material Adverse Change.* Since the date of the most recent financial statements of the Company included in the Registration Statement, the Pricing Disclosure Package and the Prospectus, (i) there has not been any material change in the capital stock (other than the issuance of shares of Common Stock upon exercise of stock options and warrants described as outstanding in, and the grant of options and awards under existing equity incentive plans described in, the Registration Statement, the Pricing Disclosure Package and the Prospectus), short-term debt or long-term debt of the Company or any of its subsidiaries, or any dividend or distribution of any kind declared, set aside for payment, paid or made by the Company on any class of capital stock, or any material adverse change, or any development involving a prospective material adverse change, in or affecting the business, properties, management, financial position, stockholders' equity, results of operations or prospects of the Company and its subsidiaries taken as a whole; (ii) neither the Company nor any of its subsidiaries has entered into any transaction or agreement (whether or not in the ordinary course of business) that is material to the Company and its subsidiaries taken as a whole or incurred any liability or obligation, direct or contingent, that is material to the Company and its subsidiaries taken as a whole; and (iii) neither the Company nor any of its subsidiaries has sustained any loss or interference with its business that is material to the Company and its subsidiaries taken as a whole and that is either from fire, explosion, flood or other calamity, whether or not covered by insurance, or from any labor disturbance or dispute or any action, order or decree of any court or arbitrator or governmental or regulatory authority, except in each case as otherwise disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus.

(i) *Organization and Good Standing.* The Company and each of its subsidiaries have been duly organized and are validly existing and in good standing under the laws of their respective jurisdictions of organization, are duly qualified to do business and are in good standing in each jurisdiction in which their respective ownership or lease of property or the conduct of their respective businesses requires such qualification, and have all power and authority necessary to own or hold their respective properties and to conduct the businesses in which they are engaged, except where the failure to be so qualified or in good standing or have such power or

authority would not, individually or in the aggregate, reasonably be expected to have a material adverse effect on the business, properties, management, financial position, stockholders' equity, results of operations or prospects of the Company and its subsidiaries taken as a whole or on the performance by the Company of its obligations under this Agreement (a "Material Adverse Effect"). The Company does not own or control, directly or indirectly, any corporation, association or other entity other than the subsidiaries listed in Exhibit 21 to the Registration Statement. The subsidiaries listed in Schedule 2 to this Agreement are the only significant subsidiaries of the Company.

(j) *Capitalization.* The Company has an authorized capitalization as set forth in the Registration Statement, the Pricing Disclosure Package and the Prospectus under the heading "Capitalization" and "Description of Capital Stock"; all the outstanding shares of capital stock of the Company have been duly and validly authorized and issued and are fully paid and non-assessable and are not subject to any pre-emptive or similar rights that have not been duly waived or satisfied; except as described in or expressly contemplated by the Registration Statement, the Pricing Disclosure Package and the Prospectus, there are no outstanding rights (including, without limitation, pre-emptive rights), warrants or options to acquire, or instruments convertible into or exchangeable for, any shares of capital stock or other equity interest in the Company or any of its subsidiaries, or any contract, commitment, agreement, understanding or arrangement of any kind relating to the issuance of any capital stock of the Company or any such subsidiary, any such convertible or exchangeable securities or any such rights, warrants or options; the capital stock of the Company conforms in all material respects to the description thereof contained in the Registration Statement, the Pricing Disclosure Package and the Prospectus; and all the outstanding shares of capital stock or other equity interests of each subsidiary owned, directly or indirectly, by the Company have been duly and validly authorized and issued, are fully paid and non-assessable (except, in the case of any foreign subsidiary, for directors' qualifying shares) and are owned directly or indirectly by the Company, free and clear of any lien, charge, encumbrance, security interest, restriction on voting or transfer or any other claim of any third party.

(k) *Stock Options.* With respect to the stock options (the "Stock Options") granted pursuant to the stock-based compensation plans of the Company and its subsidiaries (the "Company Stock Plans"), (i) each Stock Option intended to qualify as an "incentive stock option" under Section 422 of the Internal Revenue Code of 1986, as amended (the "Code") so qualifies, (ii) each grant of a Stock Option was duly authorized no later than the date on which the grant of such Stock Option was by its terms to be effective by all necessary corporate action, including, as applicable, approval by the board of directors of the Company (or a duly constituted and authorized committee thereof) and any required stockholder approval by the necessary number of votes or written consents, and the award agreement governing such grant (if any) was duly executed and delivered by each party thereto, (iii) each such grant was made in accordance with the terms of the Company Stock Plans and all other applicable laws and regulatory rules or requirements and (iv) each such grant was properly accounted for in accordance with GAAP in the financial statements (including the related notes) of the Company. Each Company Stock Plan is accurately described in all material respects in the Registration Statement, the Pricing Disclosure Package and the Prospectus. The Company has not knowingly granted, and there is no and has been no policy or practice of the Company granting, Stock Options, prior to, or otherwise coordinating the grant of Stock Options with, the release or other public announcement of material information regarding the Company or its subsidiaries or their results of operations or prospects.

(l) *Due Authorization.* The Company has full right, power and authority to execute and deliver this Agreement and to perform its obligations hereunder; and all action required to be taken for the due and proper authorization, execution and delivery by it of this Agreement and the consummation by it of the transactions contemplated hereby has been duly and validly taken.

(m) *Underwriting Agreement.* This Agreement has been duly authorized, executed and delivered by the Company.

(n) *The Shares.* The Shares to be issued and sold by the Company hereunder have been duly authorized by the Company and, when issued and delivered and paid for as provided herein, will be duly and validly issued, will be fully paid and nonassessable and will conform in all material respects to the descriptions thereof in the Registration Statement, the Pricing Disclosure Package and the Prospectus; and the issuance of the Shares is not subject to any preemptive or similar rights that have not been duly waived or satisfied;

(o) *Listing.* The Shares have been approved for listing on the Nasdaq Market, subject to notice of issuance.

(p) *No Violation or Default.* Neither the Company nor any of its subsidiaries is (i) in violation of its charter or by-laws or similar organizational documents; (ii) in default, and no event has occurred that, with notice or lapse of time or both, would constitute such a default, in the due performance or observance of any term, covenant or condition contained in any indenture, mortgage, deed of trust, loan agreement or other agreement or instrument to which the Company or any of its subsidiaries is a party or by which the Company or any of its subsidiaries is bound or to which any of the property or assets of the Company or any of its subsidiaries is subject; or (iii) in violation of any law or statute or any judgment, order, rule or regulation of any court or arbitrator or governmental or regulatory authority, except, in the case of clauses (ii) and (iii) above, for any such default or violation that would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

(q) *No Conflicts.* The execution, delivery and performance by the Company of this Agreement, the issuance and sale of the Shares and the consummation of the transactions contemplated by this Agreement or the Pricing Disclosure Package and the Prospectus will not (i) conflict with or result in a breach or violation of any of the terms or provisions of, or constitute a default under, result in the termination, modification or acceleration of, or result in the creation or imposition of any lien, charge or encumbrance upon any property, right or assets of the Company or any of its subsidiaries pursuant to, any indenture, mortgage, deed of trust, loan agreement or other agreement or instrument to which the Company or any of its subsidiaries is a party or by which the Company or any of its subsidiaries is bound or to which any of the property, right or assets of the Company or any of its subsidiaries is subject, (ii) result in any violation of the provisions of the charter or by-laws or similar organizational documents of the Company or any of its subsidiaries or (iii) result in the violation of any law or statute or any judgment, order, rule or regulation of any court or arbitrator or governmental or regulatory authority, except, in the case of clauses (i) and (iii) above, for any such conflict, breach, violation, default, lien, charge or encumbrance that would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

(r) *No Consents Required.* No consent, filing, approval, authorization, order, license, registration or qualification of or with any court or arbitrator or governmental or

regulatory authority is required for the execution, delivery and performance by the Company of this Agreement, the issuance and sale of the Shares and the consummation of the transactions contemplated by this Agreement, except for the registration of the Shares under the Securities Act and such consents, approvals, authorizations, orders and registrations or qualifications as may be required by the Financial Industry Regulatory Authority, Inc. ("FINRA") and under applicable state securities laws in connection with the purchase and distribution of the Shares by the Underwriters.

(s) *Legal Proceedings.* Except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, there are no legal, governmental or regulatory investigations, actions, demands, claims, suits, arbitrations, inquiries or proceedings ("Actions") pending to which the Company or any of its subsidiaries is or may reasonably be expected to become a party or to which any property of the Company or any of its subsidiaries is or may reasonably be expected to become the subject that, individually or in the aggregate, if determined adversely to the Company or any of its subsidiaries, would reasonably be expected to have a Material Adverse Effect; to the knowledge of the Company, no such Actions are threatened or contemplated by any governmental or regulatory authority or threatened by others; and (i) there are no current or pending Actions that are required under the Securities Act to be described in the Registration Statement, the Pricing Disclosure Package or the Prospectus that are not so described in the Registration Statement, the Pricing Disclosure Package and the Prospectus and (ii) there are no statutes, regulations or contracts or other documents that are required under the Securities Act to be filed as exhibits to the Registration Statement or described in the Registration Statement, the Pricing Disclosure Package or the Prospectus that are not so filed as exhibits to the Registration Statement or described in the Registration Statement, the Pricing Disclosure Package and the Prospectus.

(t) *Independent Accountants*. Deloitte LLP, who has certified certain financial statements of the Company and its subsidiaries is an independent registered public accounting firm with respect to the Company and its subsidiaries within the applicable rules and regulations adopted by the Commission and the Public Company Accounting Oversight Board (United States) and as required by the Securities Act.

(u) *Title to Real and Personal Property*. The Company and its subsidiaries have good and marketable title in fee simple (in the case of real property) to, or have valid rights to lease or otherwise use, all items of real and personal property and assets that are material to the respective businesses of the Company and its subsidiaries, in each case free and clear of all liens, encumbrances, claims and defects and imperfections of title except those that (i) do not materially interfere with the use made and proposed to be made of such property by the Company and its subsidiaries or (ii) would not reasonably be expected, individually or in the aggregate, to have a Material Adverse Effect.

(v) *Title to Intellectual Property*. The Company and its subsidiaries own, or possess valid and enforceable licensed rights to use, or can acquire on reasonable terms, all material patents, patent applications, trademarks, service marks, trade names, trademark registrations, service mark registrations, trade dress, designs, data, database rights, internet domain names, copyrights, works of authorship, licenses, proprietary information and know-how (including trade secrets and other unpatented and/or unpatentable proprietary or confidential information, systems or procedures) necessary for the conduct of their respective businesses as currently conducted and as proposed to be conducted (collectively, "Intellectual Property"), and the conduct of their respective businesses does

not and will not infringe, misappropriate or otherwise conflict in any material respect with any such rights of others. The Intellectual Property of the Company has not been adjudged by a court of competent jurisdiction to be invalid or unenforceable, in whole or in part, and the Company is unaware of any facts which would form a reasonable basis for any such adjudication. The Company and its subsidiaries have not received any notice of any claim of infringement, misappropriation or conflict with any intellectual property rights of another which would, singly or in the aggregate, result in a Material Adverse Effect, and the Company is unaware of any facts which would form a reasonable basis for any such notice or claim. To the Company's knowledge and except for customary reversionary rights of third-party licensors with respect to Intellectual Property that is disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus ("Disclosure Documents") as owned by or licensed to the Company or its subsidiaries: (i) there are no third parties who have rights to any Intellectual Property and (ii) there is no infringement by third parties of any Intellectual Property. Except as disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, there is no pending or, to the Company's knowledge, threatened action, suit, proceeding or claim by others: (A) challenging the Company's rights in or to any Intellectual Property, and the Company is unaware of any facts which would form a reasonable basis for any such action, suit, proceeding or claim; (B) challenging the validity, enforceability or scope of any Intellectual Property, and the Company is unaware of any facts which would form a reasonable basis for any such action, suit, proceeding or claim; or (C) asserting that the Company or its subsidiaries infringe, misappropriate, or otherwise violate, or would, upon the commercialization of any product or service described in the Disclosure Documents as under development, infringe, misappropriate or otherwise violate, any intellectual property rights of others, and the Company is unaware of any facts which would form a reasonable basis for any such action, suit, proceeding or claim. The Company and its subsidiaries have materially complied with the terms of each agreement pursuant to which Intellectual Property has been licensed to the Company or its subsidiaries, and all such agreements are in full force and effect. To the Company's knowledge, there are no material defects in any of the patents or patent applications included in the Intellectual Property. The Company and its subsidiaries have taken all reasonable steps to protect, maintain and safeguard their Intellectual Property, including the execution of appropriate nondisclosure, confidentiality agreements and invention assignment agreements and invention assignments with their employees. The duty of candor and good faith as required by the United States Patent and Trademark Office during the prosecution of the United States patents and patent applications included in the Intellectual Property have been complied with; and in all foreign offices having similar requirements, all such requirements have been complied with. To the Company's knowledge, none of the Company owned Intellectual Property or technology (including information technology and outsourced arrangements) employed by the Company or its subsidiaries has been obtained or is being used by the Company or its subsidiary in violation of any contractual obligation binding on the Company or its subsidiaries or any of their respective officers, directors or employees or otherwise in violation of the rights of any persons. The product candidates described in the Disclosure Documents as under development by the Company or its subsidiaries fall within the scope of the claims of one or more patents or patent applications owned by, or exclusively licensed to, the Company or its subsidiaries.

(w) *Trade Secrets*. The Company and its subsidiaries have taken reasonable and customary actions to protect their rights in and prevent the unauthorized use and disclosure of material trade secrets and confidential business information (including confidential source code, ideas, research and development information, know-how, formulas, compositions, technical data, designs, drawings, specifications, research records, records of inventions, test information, financial, marketing and business data, customer and supplier lists and information, pricing and

cost information, business and marketing plans and proposals) owned by the Company and its subsidiaries, and, to the knowledge of the Company, there has been no unauthorized use or disclosure.

(x) *IT Assets*. Except as could not reasonably be expected to have a Material Adverse Effect (i) the computers, software, servers, networks, data communications lines, and other information technology systems owned, licensed, leased or otherwise used by the Company or its subsidiaries (excluding any public networks) (collectively, the "IT Assets") operate and perform as is necessary for the operation of the business of the Company and its subsidiaries as currently conducted and as proposed to be conducted as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, and (ii) such IT Assets are not infected by viruses, disabling code or other harmful code. The Company and its subsidiaries have implemented and maintained all reasonably necessary controls, policies, procedures, and safeguards to maintain and protect their confidential information and the integrity, continuous operation, redundancy and security of all IT Assets and data (including all Personal Data (defined below) that is sensitive, confidential or regulated data ("Confidential Data") used in connection with their businesses, and there have been no breaches, violations, outages or unauthorized uses of or accesses to same, except for those that have been remedied without material cost or liability or the duty to notify any other person, nor any incidents under internal review or investigations relating to the same.

(y) *FDA and USDA Compliance*. The Company: (A) is and at all times has been in compliance with all statutes, rules or regulations of the FDA, USDA and other comparable governmental entities applicable to the ownership, testing, development, manufacture, packaging, processing, use, distribution, marketing, labeling, promotion, sale, offer for sale, storage, import, export or disposal of any product under development, manufactured or distributed by the Company ("Applicable Laws"), except where such noncompliance would not singly or in the aggregate reasonably be expected to result in a Material Adverse Effect; (B) possesses all material licenses, certificates, approvals, clearances, exemptions, authorizations, permits and supplements or amendments thereto required by any such Applicable Laws ("Authorizations") and such Authorizations are valid and in full force and effect and the Company is not in material violation of any term of any such Authorizations; and (C) has not received written notice that the FDA or any governmental entity has taken, is taking or intends to take action to limit, suspend, modify or revoke any Authorizations and has no knowledge that the FDA or any governmental entity is considering such action.

(z) *Tests and Preclinical and Clinical Trials*. The studies, tests and preclinical and clinical trials conducted by or, to the Company's knowledge, on behalf of the Company were and, if still ongoing, are being conducted in all material respects in accordance with Applicable Laws, including, without limitation, the Federal Food, Drug and Cosmetic Act; except to the extent disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, the Company is not aware of any studies, tests or trials, the results of which reasonably call into question the study, test, or trial results described or referred to in the Registration Statement, the Pricing Disclosure Package and the Prospectus when viewed in the context in which such results are described and the state of development; and, except to the extent disclosed in the Registration Statement, the Pricing Disclosure Package or the Prospectus, the Company has not received any written notices or correspondence from the FDA or any governmental entity requiring the termination or suspension of any studies, tests or preclinical or clinical trials conducted by or on behalf of the Company, other than ordinary course communications with respect to modifications in connection with the design and implementation of such trials.

(aa) *Compliance with Health Care Laws*. The Company and its subsidiaries are, and at all times since January 1, 2015 have been, in compliance with all Health Care Laws, except where such noncompliance would not singly or in the aggregate reasonably be expected to result in a Material Adverse Effect. For purposes of this Agreement, "Health Care Laws" means: (i) the Federal Food, Drug, and Cosmetic Act and the regulations promulgated thereunder; (ii) all applicable federal, state, local and foreign health care fraud and abuse laws, including, without limitation, , the U.S. Anti-Kickback Statute (42 U.S.C. Section 1320a-7b(b)), the U.S. Civil False Claims Act (31 U.S.C. Section 3729 et seq.), the criminal False Statements Law (42 U.S.C. Section 1320a-7b(a)), 18 U.S.C. Sections 286, and 287, and the health care fraud criminal provisions under the U.S. Health Insurance Portability and Accountability Act of 1996 ("HIPAA") (42 U.S.C. Section 1320d et seq.), the civil monetary penalties law (42 U.S.C. Section 1320a-7a), the exclusions law (42 U.S.C. Section 1320a-7), the Physician Payments Sunshine Act (42 U.S.C. Section 1320-7h), (iii) HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act (42 U.S.C. Section 17921 et seq., (iv) Medicare (Title XVIII of the Social Security Act), Medicaid (Title XIX of the Social Security Act), the Public Health Service Act (42 U.S.C. § 201 et seq.), and (v) the regulations promulgated pursuant to such statutes and any state or foreign counterpart thereof. Neither the Company nor any of its subsidiaries has received written notice of any claim, action, suit, proceeding, hearing, enforcement, investigation, arbitration or other action from any court or arbitrator or governmental or regulatory authority or third party alleging that any product operation or activity is in violation of any Health Care Laws nor, to the Company's knowledge, is any such claim, action, suit, proceeding, hearing, enforcement, investigation, arbitration or other action threatened. The Company and its subsidiaries have filed, maintained or submitted all reports, documents, forms, notices, applications, records, claims, submissions and supplements or amendments as required by any Health Care Laws, and all such reports, documents, forms, notices, applications, records, claims, submissions and supplements or amendments were complete and accurate on the date filed in all respects (or were corrected or supplemented by a subsequent submission), except where such failure would not, singly or in the aggregate, reasonably be expected to result in a Material Adverse Effect. Neither the Company nor any of its subsidiaries is a party to any corporate integrity agreements, monitoring agreements, consent decrees, settlement orders, or similar agreements with or imposed by any governmental or regulatory authority. Additionally, neither the Company, any of its subsidiaries nor any of their respective employees, officers, directors, or to the Company's knowledge, agents has been excluded, suspended or debarred from participation in any U.S. federal health care program or human clinical research or, to the knowledge of the Company, is subject to a governmental inquiry, investigation, proceeding, or other similar action that could reasonably be expected to result in debarment, suspension, or exclusion

(bb) *No Undisclosed Relationships*. No relationship, direct or indirect, exists between or among the Company or any of its subsidiaries, on the one hand, and the directors, officers, stockholders, customers, suppliers or other affiliates of the Company or any of its subsidiaries, on the other, that is required by the Securities Act to be described in each of the Registration Statement and the Prospectus and that is not so described in such documents and in the Pricing Disclosure Package.

(cc) *Investment Company Act*. The Company is not and, after giving effect to the offering and sale of the Shares and the application of the proceeds thereof as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, will not be required to

register as an "investment company" or an entity "controlled" by an "investment company" within the meaning of the Investment Company Act of 1940, as amended, and the rules and regulations of the Commission thereunder (collectively, the "Investment Company Act").

(dd) *Taxes.* The Company and its subsidiaries have paid all federal, state, local and foreign taxes and filed all tax returns required to be paid or filed through the date hereof, except for those taxes and tax returns whose failure to pay or file would not reasonably be expected to have a Material Adverse Effect; and except as otherwise disclosed in each of the Registration Statement, the Pricing Disclosure Package and the Prospectus, there is no tax deficiency that has been, or could reasonably be expected to be, asserted against the Company or any of its subsidiaries or any of their respective properties or assets that has had or would reasonably be expected to have a Material Adverse Effect, except for any tax deficiency being contested in good faith and for which appropriate reserves have been provided in accordance with GAAP.

(ee) *Licenses and Permits.* The Company and its subsidiaries possess all licenses, certificates, permits and other authorizations issued by, and have made all declarations and filings with, the appropriate federal, state, local or foreign governmental or regulatory authorities that are necessary for the ownership or lease of their respective properties or the conduct of their respective businesses as described in each of the Registration Statement, the Pricing Disclosure Package and the Prospectus, except where the failure to possess or make the same would not, individually or in the aggregate, reasonably be expected have a Material Adverse Effect; and except as described in each of the Registration Statement, the Pricing Disclosure Package and the Prospectus, neither the Company nor any of its subsidiaries has received written notice of any revocation or modification of any such license, certificate, permit or authorization or has any reason to believe that any such license, certificate, permit or authorization will not be renewed in the ordinary course, except where such revocation or modification would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect. No party granting any such licenses, certificates, permits and other authorizations has taken any action to limit, suspend or revoke the same in any respect, except where such action would not, singly or in the aggregate, reasonably be expected to result in a Material Adverse Effect. The Company and its subsidiaries have filed, obtained, maintained or submitted all reports, documents, forms, notices, applications, records, claims, submissions and supplements or amendments as required and that all such reports, documents, forms, notices, applications, records, claims, submissions and supplements or amendments were complete and correct on the date filed (or were corrected or supplemented by a subsequent submission) as required for maintenance of their licenses, certificates, permits and other authorizations that are necessary for the conduct of their respective businesses, except where such non-compliance would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

(ff) *No Labor Disputes.* No labor disturbance by or dispute with employees of the Company or any of its subsidiaries exists or, to the knowledge of the Company, is threatened, and the Company is not aware of any existing or imminent labor disturbance by, or dispute with, the employees of any of its or its subsidiaries' principal suppliers, contractors or customers, except in any event as would not reasonably be expected to have a Material Adverse Effect. Neither the Company nor any of its subsidiaries has received any notice of cancellation or termination with respect to any collective bargaining agreement that is material to the Company.

(gg) *Certain Environmental Matters.* (i) The Company and its subsidiaries (x) are in compliance with all, and have not violated any, applicable federal, state, local and foreign laws,

rules, regulations, requirements, decisions, judgments, decrees, orders and other legally enforceable requirements relating to pollution or the protection of human health or safety, the environment, natural resources, hazardous or toxic substances or wastes, pollutants or contaminants (collectively, "Environmental Laws"); (y) have received and are in compliance with all, and have not violated any, permits, licenses, certificates or other authorizations or approvals required of them under any Environmental Laws to conduct their respective businesses; and (z) have not received written notice of any actual or potential liability or obligation under or relating to, or any actual or potential violation of, any Environmental Laws, including for the investigation or remediation of any disposal or release of hazardous or toxic substances or wastes, pollutants or contaminants, and have no knowledge of any event or condition that would reasonably be expected to result in any such notice, and (ii) there are no costs or liabilities associated with Environmental Laws of or relating to the Company or its subsidiaries, except in the case of each of (i) and (ii) above, for any such matter as would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect; and (iii) except as described in each of the Pricing Disclosure Package and the Prospectus, (x) there is no proceeding that is pending, or that is known by the Company to be contemplated, against the Company or any of its subsidiaries under any Environmental Laws in which a governmental entity is also a party, other than such proceeding regarding which the Company reasonably believes no monetary sanctions of $100,000 or more will be imposed, (y) the Company and its subsidiaries are not aware of any facts or issues regarding compliance with Environmental Laws, or liabilities or other obligations under Environmental Laws or concerning hazardous or toxic substances or wastes, pollutants or contaminants, that would, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect, and (z) none of the Company or its subsidiaries anticipates material capital expenditures relating to any Environmental Laws.

(hh) *Hazardous Materials*. There has been no storage, generation, transportation, use, handling, treatment, Release or threat of Release of Hazardous Materials by, relating to or caused by the Company or any of its subsidiaries (or, to the knowledge of the Company and its subsidiaries, any other entity (including any predecessor) for whose acts or omissions the Company or any of its subsidiaries is or could reasonably be expected to be liable) at, on, under or from any property or facility now or previously owned, operated or leased by the Company or any of its subsidiaries, or at, on, under or from any other property or facility, in violation of any Environmental Laws or in a manner or amount or to a location that could reasonably be expected to result in any liability under any Environmental Law, except for any violation or liability which would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect. "Hazardous Materials" means any material, chemical, substance ,waste, pollutant, contaminant, compound, mixture, or constituent thereof, in any form or amount, including petroleum (including crude oil or any fraction thereof) and petroleum products, natural gas liquids, asbestos and asbestos containing materials, naturally occurring radioactive materials, brine, and drilling mud, regulated or which can give rise to liability under any Environmental Law. "Release" means any spilling, leaking, seepage, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, disposing, depositing, dispersing, or migrating in, into or through the environment, or in, into from or through any building or structure.

(ii) *Compliance with ERISA.* (i) Each employee benefit plan, within the meaning of Section 3(3) of the Employee Retirement Income Security Act of 1974, as amended ("ERISA"), for which the Company or any member of its "Controlled Group" (defined as any entity, whether or not incorporated, that is under common control with the Company within the meaning of

Section 4001(a)(14) of ERISA or any entity that would be regarded as a single employer with the Company under Section 414(b),(c),(m) or (o) of the Internal Revenue Code of 1986, as amended (the "Code")) would have any liability (each, a "Plan") has been maintained in compliance with its terms and the requirements of any applicable statutes, orders, rules and regulations, including but not limited to ERISA and the Code; (ii) no prohibited transaction, within the meaning of Section 406 of ERISA or Section 4975 of the Code, has occurred with respect to any Plan, excluding transactions effected pursuant to a statutory or administrative exemption; (iii) for each Plan that is subject to the funding rules of Section 412 of the Code or Section 302 of ERISA, no Plan has failed (whether or not waived), or is reasonably expected to fail, to satisfy the minimum funding standards (within the meaning of Section 302 of ERISA or Section 412 of the Code) applicable to such Plan; (iv) no Plan is, or is reasonably expected to be, in "at risk status" (within the meaning of Section 303(i) of ERISA) and no Plan that is a "multiemployer plan" within the meaning of Section 4001(a)(3) of ERISA is in "endangered status" or "critical status" (within the meaning of Sections 304 and 305 of ERISA); (v) the fair market value of the assets of each Plan exceeds the present value of all benefits accrued under such Plan (determined based on those assumptions used to fund such Plan); (vi) no "reportable event" (within the meaning of Section 4043(c) of ERISA and the regulations promulgated thereunder) has occurred or is reasonably expected to occur; (vii) each Plan that is intended to be qualified under Section 401(a) of the Code is so qualified, and, to the knowledge of the Company, nothing has occurred, whether by action or by failure to act, which would reasonably be expected to cause the loss of such qualification; (viii) neither the Company nor any member of the Controlled Group has incurred, nor reasonably expects to incur, any liability under Title IV of ERISA (other than contributions to the Plan or premiums to the Pension Benefit Guarantee Corporation, in the ordinary course and without default) in respect of a Plan (including a "multiemployer plan" within the meaning of Section 4001(a)(3) of ERISA); and (ix) none of the following events has occurred or is reasonably likely to occur: (A) a material increase in the aggregate amount of contributions required to be made to all Plans by the Company or its Controlled Group affiliates in the current fiscal year of the Company and its Controlled Group affiliates compared to the amount of such contributions made in the Company's and its Controlled Group affiliates' most recently completed fiscal year; or (B) a material increase in the Company and its subsidiaries' "accumulated post-retirement benefit obligations" (within the meaning of Accounting Standards Codification Topic 715-60) compared to the amount of such obligations in the Company and its subsidiaries' most recently completed fiscal year, except in each case with respect to the events or conditions set forth in (i) through (ix) hereof, as would not, individually or in the aggregate, have a Material Adverse Effect.

(jj) *Disclosure Controls*. The Company and its subsidiaries maintain an effective system of "disclosure controls and procedures" (as defined in Rule 13a-15(e) of the Exchange Act) that complies with the requirements of the Exchange Act and that has been designed to ensure that information required to be disclosed by the Company in reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the Commission's rules and forms, including controls and procedures designed to ensure that such information is accumulated and communicated to the Company's management as appropriate to allow timely decisions regarding required disclosure.

(kk) *Accounting Controls.* The Company and its subsidiaries maintain systems of "internal control over financial reporting" (as defined in Rule 13a-15(f) of the Exchange Act) that are designed to comply with the requirements of the Exchange Act and have been designed by, or under the supervision of, their respective principal executive and principal financial officers, or

persons performing similar functions, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles, including, but not limited to, internal accounting controls sufficient to provide reasonable assurance that (i) transactions are executed in accordance with management's general or specific authorizations; (ii) transactions are recorded as necessary to permit preparation of financial statements in conformity with generally accepted accounting principles and to maintain asset accountability; (iii) access to assets is permitted only in accordance with management's general or specific authorization; and (iv) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action is taken with respect to any differences. Except as disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, there are no material weaknesses in the Company's internal controls. The Company's auditors and the Audit Committee of the Board of Directors of the Company have been advised of: (i) all significant deficiencies and material weaknesses in the design or operation of internal controls over financial reporting which have adversely affected or are reasonably likely to adversely affect the Company's ability to record, process, summarize and report financial information; and (ii) any fraud, whether or not material, that involves management or other employees who have a significant role in the Company's internal controls over financial reporting.

(ll) *Insurance.* The Company and its subsidiaries have insurance covering their respective properties, operations, personnel and businesses, including business interruption insurance, which insurance is in amounts and insures against such losses and risks as are generally maintained by similarly situated companies and which the Company believes are reasonably adequate to protect the Company and its subsidiaries and their respective businesses; and neither the Company nor any of its subsidiaries has (i) received notice from any insurer or agent of such insurer that capital improvements or other expenditures are required or necessary to be made in order to continue such insurance or (ii) any reason to believe that it will not be able to renew its existing insurance coverage as and when such coverage expires or to obtain similar coverage at reasonable cost from similar insurers as may be necessary to continue its business.

(mm) *No Unlawful Payments.* Neither the Company nor any of its subsidiaries nor any director, officer, or employee of the Company or any of its subsidiaries nor, to the knowledge of the Company, any agent, affiliate or other person associated with or acting on behalf of the Company or any of its subsidiaries has (i) used any corporate funds for any unlawful contribution, gift, entertainment or other unlawful expense relating to political activity; (ii) made or taken an act in furtherance of an offer, promise or authorization of any direct or indirect unlawful payment or benefit to any foreign or domestic government or regulatory official or employee, including of any government-owned or controlled entity or of a public international organization, or any person acting in an official capacity for or on behalf of any of the foregoing, or any political party or party official or candidate for political office; (iii) violated or is in violation of any provision of the Foreign Corrupt Practices Act of 1977, as amended, or any applicable law or regulation implementing the OECD Convention on Combating Bribery of Foreign Public Officials in International Business Transactions, or committed an offence under the Bribery Act 2010 of the United Kingdom, or any other applicable anti-bribery or anti-corruption laws; or (iv) made, offered, agreed, requested or taken an act in furtherance of any unlawful bribe or other unlawful benefit, including, without limitation, any rebate, payoff, influence payment, kickback or other unlawful or improper payment or benefit. The Company and its subsidiaries have instituted, maintain and enforce, and will continue to maintain and enforce policies and procedures designed to promote and ensure compliance with all applicable anti-bribery and anti-corruption laws.

(nn) *Compliance with Anti-Money Laundering Laws.* The operations of the Company and its subsidiaries are and have been conducted at all times in compliance with applicable financial recordkeeping and reporting requirements, including those of the Currency and Foreign Transactions Reporting Act of 1970, as amended, the applicable money laundering statutes of all jurisdictions where the Company or any of its subsidiaries conducts business, the rules and regulations thereunder and any related or similar rules, regulations or guidelines issued, administered or enforced by any governmental or regulatory agency (collectively, the "Anti-Money Laundering Laws") and no action, suit or proceeding by or before any court or governmental or regulatory agency, authority or body or any arbitrator involving the Company or any of its subsidiaries with respect to the Anti-Money Laundering Laws is pending or, to the knowledge of the Company, threatened.

(oo) *No Conflicts with Sanctions Laws.* Neither the Company nor any of its subsidiaries, directors, officers or employees, nor, to the knowledge of the Company, any agent, or affiliate or other person associated with or acting on behalf of the Company or any of its subsidiaries is currently the subject or the target of any sanctions administered or enforced by the U.S. Government, (including, without limitation, the Office of Foreign Assets Control of the U.S. Department of the Treasury or the U.S. Department of State and including, without limitation, the designation as a "specially designated national" or "blocked person"), the United Nations Security Council, the European Union, Her Majesty's Treasury, or other relevant sanctions authority (collectively, "Sanctions"), nor is the Company or any of its subsidiaries located, organized or resident in a country or territory that is the subject or the target of Sanctions, including, without limitation, Cuba, Iran, North Korea, Syria, and the Crimea Region of the Ukraine (each, a "Sanctioned Country"); and the Company will not directly or indirectly use the proceeds of the offering of the Shares hereunder, or lend, contribute or otherwise make available such proceeds to any subsidiary, joint venture partner or other person or entity (i) to fund or facilitate any activities of or business with any person that, at the time of such funding or facilitation, is the subject or the target of Sanctions, (ii) to fund or facilitate any activities of or business in any Sanctioned Country or (iii) in any other manner that will result in a violation by any person (including any person participating in the transaction, whether as underwriter, advisor, investor or otherwise) of Sanctions. For the past five years, the Company and its subsidiaries have not knowingly engaged in and are not now knowingly engaged in any dealings or transactions with any person that at the time of the dealing or transaction is or was the subject or the target of Sanctions or with any Sanctioned Country.

(pp) *No Restrictions on Subsidiaries*. No subsidiary of the Company is currently prohibited, directly or indirectly, under any agreement or other instrument to which it is a party or is subject, from paying any dividends to the Company, from making any other distribution on such subsidiary's capital stock or similar ownership interest, from repaying to the Company any loans or advances to such subsidiary from the Company or from transferring any of such subsidiary's properties or assets to the Company or any other subsidiary of the Company.

(qq) *No Broker's Fees.* Neither the Company nor any of its subsidiaries is a party to any contract, agreement or understanding with any person (other than this Agreement) that would give rise to a valid claim against the Company or any of its subsidiaries or any Underwriter for a brokerage commission, finder's fee or like payment in connection with the offering and sale of the Shares.

(rr) *No Registration Rights*. No person has the right to require the Company or any of its subsidiaries to register any securities for sale under the Securities Act by reason of the filing of the Registration Statement with the Commission or the issuance and sale of the Shares, except for such rights as have duly been waived.

(ss) *No Stabilization.* Neither the Company nor any of its subsidiaries or, to the Company's knowledge, affiliates have taken, directly or indirectly, any action designed to or that could reasonably be expected to cause or result in any stabilization or manipulation of the price of the Shares.

(tt) *Margin Rules*. Neither the issuance, sale and delivery of the Shares nor the application of the proceeds thereof by the Company as described in each of the Registration Statement, the Pricing Disclosure Package and the Prospectus will violate Regulation T, U or X of the Board of Governors of the Federal Reserve System or any other regulation of such Board of Governors.

(uu) *Forward-Looking Statements.* No forward-looking statement (within the meaning of Section 27A of the Securities Act and Section 21E of the Exchange Act) contained in the Registration Statement, the Pricing Disclosure Package or the Prospectus has been made or reaffirmed without a reasonable basis or has been disclosed other than in good faith.

(vv) Statistical and Market Data. Nothing has come to the attention of the Company that has caused the Company to believe that the statistical and market-related data included in each of the Registration Statement, the Pricing Disclosure Package and the Prospectus is not based on or derived from sources that are reliable and accurate in all material respects.

(ww) *Sarbanes-Oxley Act*. There is and has been no failure on the part of the Company or any of the Company's directors or officers, in their capacities as such, to comply with any provision of the Sarbanes-Oxley Act of 2002, as amended, and the rules and regulations promulgated in connection therewith (the "Sarbanes-Oxley Act"), including Section 402 related to loans.

(xx) *Status under the Securities Act*. At the time of filing the Registration Statement and any post-effective amendment thereto, at the earliest time thereafter that the Company or any offering participant made a *bona fide* offer (within the meaning of Rule 164(h)(2) under the Securities Act) of the Shares and at the date hereof, the Company was not and is not an "ineligible issuer," as defined in Rule 405 under the Securities Act. The Company has paid the registration fee for this offering pursuant to Rule 456(b)(1) under the Securities Act or will pay such fee within the time period required by such rule (without giving effect to the proviso therein) and in any event prior to the Closing Date.

(yy) *No Ratings*. There are (and prior to the Closing Date, will be) no debt securities, convertible securities or preferred stock issued or guaranteed by the Company or any of its subsidiaries that are rated by a "nationally recognized statistical rating organization", as such term is defined in Section 3(a)(62) of the Exchange Act.

(zz) *Cybersecurity*. The Company and its subsidiaries' information technology assets and equipment, computers, systems, networks, hardware, software, websites, applications, and databases (collectively, "IT Systems") are adequate for, and operate and perform in all material

respects as required in connection with the operation of the business of the Company and the Subsidiaries as currently conducted, free and clear of all material bugs, errors, defects, Trojan horses, time bombs, malware and other corruptants. The Company and its subsidiaries have implemented and maintained commercially reasonable controls, policies, procedures, and safeguards to maintain and protect their material confidential information and the integrity, continuous operation, redundancy and security of all IT Systems and data (including all personal, personally identifiable, sensitive, confidential or regulated data ("Personal Data"), used in connection with their businesses. There have been no breaches, violations, outages or unauthorized uses of or accesses to same, except for those that have been remedied without material cost or liability or the duty to notify any other person, nor any incidents under internal review or investigations relating to the same. The Company and its subsidiaries are presently in material compliance with all applicable laws or statutes and all judgments, orders, rules and regulations of any court or arbitrator or governmental or regulatory authority, internal policies and contractual obligations relating to the privacy and security of IT Systems and Personal Data and to the protection of such IT Systems and Personal Data from unauthorized use, access, misappropriation or modification.

4. Further Agreements of the Company. The Company covenants and agrees with each Underwriter that:

(a) *Required Filings.* The Company will file the final Prospectus with the Commission within the time periods specified by Rule 424(b) and Rule 430A, 430B or 430C under the Securities Act, will file any Issuer Free Writing Prospectus to the extent required by Rule 433 under the Securities Act; and will furnish copies of the Prospectus and each Issuer Free Writing Prospectus (to the extent not previously delivered) to the Underwriters in New York City prior to 10:00 A.M., New York City time, on the business day next succeeding the date of this Agreement in such quantities as the Representatives may reasonably request.

(b) *Delivery of Copies.* The Company will deliver, without charge, (i) to the Representatives, four signed copies of the Registration Statement as originally filed and each amendment thereto, in each case including all exhibits and consents filed therewith; and (ii) to each Underwriter (A) a conformed copy of the Registration Statement as originally filed and each amendment thereto (without exhibits) and (B) during the Prospectus Delivery Period (as defined below), as many copies of the Prospectus (including all amendments and supplements thereto and each Issuer Free Writing Prospectus) as the Representatives may reasonably request. As used herein, the term "Prospectus Delivery Period" means such period of time after the first date of the public offering of the Shares as in the opinion of counsel for the Underwriters a prospectus relating to the Shares is required by law to be delivered (or required to be delivered but for Rule 172 under the Securities Act) in connection with sales of the Shares by any Underwriter or dealer.

(c) *Amendments or Supplements, Issuer Free Writing Prospectuses.* Before preparing, using, authorizing, approving, referring to or filing any Issuer Free Writing Prospectus, and before filing any amendment or supplement to the Registration Statement, the Pricing Disclosure Package or the Prospectus, the Company will furnish to the Representatives and counsel for the Underwriters a copy of the proposed Issuer Free Writing Prospectus, amendment or supplement for review and will not prepare, use, authorize, approve, refer to or file any such Issuer Free Writing Prospectus or file any such proposed amendment or supplement to which the Representatives reasonably object.

(d) *Notice to the Representatives.* The Company will advise the Representatives promptly, and confirm such advice in writing, (i) when the Registration Statement has become effective; (ii) when any amendment to the Registration Statement has been filed or becomes effective; (iii) when any supplement to the Pricing Disclosure Package, the Prospectus, any Issuer Free Writing Prospectus, any Written Testing-the-Waters Communication or any amendment to the Prospectus has been filed or distributed; (iv) of any request by the Commission for any amendment to the Registration Statement or any amendment or supplement to the Prospectus or the receipt of any comments from the Commission relating to the Registration Statement or any other request by the Commission for any additional information including, but not limited to, any request for information concerning any Testing-the-Waters Communication; (v) of the issuance by the Commission or any other governmental or regulatory authority of any order suspending the effectiveness of the Registration Statement or preventing or suspending the use of any Preliminary Prospectus, any of the Pricing Disclosure Package, the Prospectus or any Written Testing-the-Waters Communication or the initiation or, to the knowledge of the Company, threatening of any proceeding for that purpose or pursuant to Section 8A of the Securities Act; (vi) of the occurrence of any event or development within the Prospectus Delivery Period as a result of which the Prospectus, the Pricing Disclosure Package or any Issuer Free Writing Prospectus or Written Testing-the-Waters Communication as then amended or supplemented would include any untrue statement of a material fact or omit to state a material fact or necessary in order to make the statements therein, in the light of the circumstances existing when the Prospectus, the Pricing Disclosure Package, or any such Issuer Free Writing Prospectus or Written Testing-the-Waters Communication is delivered to a purchaser, not misleading; and (vii) of the receipt by the Company of any notice with respect to any suspension of the qualification of the Shares for offer and sale in any jurisdiction or the initiation or, to the knowledge of the Company, threatening of any proceeding for such purpose; and the Company will use its best efforts to prevent the issuance of any such order suspending the effectiveness of the Registration Statement, preventing or suspending the use of any Preliminary Prospectus, any of the Pricing Disclosure Package or the Prospectus or any Written Testing-the-Waters Communication or suspending any such qualification of the Shares and, if any such order is issued, will obtain as soon as possible the withdrawal thereof.

(e) *Ongoing Compliance.* (1) If during the Prospectus Delivery Period (i) any event or development shall occur or condition shall exist as a result of which the Prospectus as then amended or supplemented would include any untrue statement of a material fact or omit to state any material fact necessary in order to make the statements therein, in the light of the circumstances existing when the Prospectus is delivered to a purchaser, not misleading or (ii) it is necessary to amend or supplement the Prospectus to comply with law, the Company will promptly notify the Underwriters thereof and forthwith prepare and, subject to paragraph (c) above, file with the Commission and furnish to the Underwriters and to such dealers as the Representatives may designate such amendments or supplements to the Prospectus as may be necessary so that the statements in the Prospectus as so amended or supplemented will not, in the light of the circumstances existing when the Prospectus is delivered to a purchaser, be misleading or so that the Prospectus will comply with law and (2) if at any time prior to the Closing Date (i) any event or development shall occur or condition shall exist as a result of which the Pricing Disclosure Package as then amended or supplemented would include any untrue statement of a material fact or omit to state any material fact necessary in order to make the statements therein, in the light of the circumstances existing when the Pricing Disclosure Package is delivered to a purchaser, not misleading or (ii) it is necessary to amend or supplement the Pricing Disclosure Package to comply with law, the Company will promptly notify the Underwriters thereof and

forthwith prepare and, subject to paragraph (c) above, file with the Commission (to the extent required) and furnish to the Underwriters and to such dealers as the Representatives may designate such amendments or supplements to the Pricing Disclosure Package as may be necessary so that the statements in the Pricing Disclosure Package as so amended or supplemented will not, in the light of the circumstances existing when the Pricing Disclosure Package is delivered to a purchaser, be misleading or so that the Pricing Disclosure Package will comply with law.

(f) *Blue Sky Compliance.* The Company will qualify the Shares for offer and sale under the securities or Blue Sky laws of such jurisdictions as the Representatives shall reasonably request and will continue such qualifications in effect so long as required for distribution of the Shares; provided that the Company shall not be required to (i) qualify as a foreign corporation or other entity or as a dealer in securities in any such jurisdiction where it would not otherwise be required to so qualify, (ii) file any general consent to service of process in any such jurisdiction or (iii) subject itself to taxation in any such jurisdiction if it is not otherwise so subject.

(g) *Earnings Statement.* The Company will make generally available to its securityholders and the Representatives as soon as practicable an earnings statement that satisfies the provisions of Section 11(a) of the Securities Act and Rule 158 of the Commission promulgated thereunder covering a period of at least twelve months beginning with the first fiscal quarter of the Company occurring after the "effective date" (as defined in Rule 158) of the Registration Statement, provided that the Company will be deemed to have furnished such statements to its securityholders and the Representatives to the extent they are filed on the Commission's Electronic Data Gathering, Analysis and Retrieval system.

(h) *Clear Market.* For a period of 180 days after the date of the Prospectus, the Company will not (i) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, or file with, or submit to, the Commission a registration statement under the Securities Act relating to, any shares of Stock or any securities convertible into or exercisable or exchangeable for Stock, or publicly disclose the intention to make any offer, sale, pledge, disposition, submission or filing, or (ii) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of the Stock or any such other securities, whether any such transaction described in clause (i) or (ii) above is to be settled by delivery of Stock or such other securities, in cash or otherwise, without the prior written consent of J.P. Morgan Securities LLC, Goldman Sachs & Co. LLC and Jefferies LLC, other than (A) the Shares to be sold hereunder, (B) any shares of Stock of the Company issued upon the conversion of convertible preferred stock outstanding on the date of this Agreement in connection with the offering contemplated by this Agreement and as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, (C) any shares of Stock of the Company issued upon the exercise of options granted under Company Stock Plans as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, (D) any shares of Stock issued upon the exercise of warrants outstanding on the date of this Agreement and as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, (E) any options and other awards granted under a Company Stock Plan described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, (F) the filing by the Company of any registration statement on Form S-8 or a successor form thereto relating to a Company Stock Plan described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, (G) shares of Stock or other securities issued in connection with a transaction with

an unaffiliated third party that includes a bona fide commercial relationship (including joint ventures, marketing or distribution arrangements, collaboration agreements or licensing agreements) or any acquisition of assets of not less than a majority or controlling portion of the equity of another entity, provided that (x) the aggregate number of the shares issued pursuant to clause (G) shall not exceed more than five percent (5%) of the total number of outstanding shares of Stock immediately following the issuance and sale of the Underwritten Shares pursuant to this Agreement and (y) the recipient of any such shares of Stock or securities issued pursuant to clauses (C), (D), (E) and (G) during the Restricted Period shall enter into an agreement substantially in the form of Exhibit A hereto.

(i) If J.P. Morgan Securities LLC, Goldman Sachs & Co. LLC and Jefferies LLC in their sole discretion, agree to release or waive the restrictions set forth in a lock-up letter described in Section 6(n) hereof for an officer or director of the Company and provide the Company with notice of the impending release or waiver substantially in the form of Exhibit B hereto at least three business days before the effective date of the release or waiver, the Company agrees to announce the impending release or waiver by a press release substantially in the form of Exhibit C hereto through a major news service at least two business days before the effective date of the release or waiver.

(j) *Use of Proceeds.* The Company will apply the net proceeds from the sale of the Shares as described in each of the Registration Statement, the Pricing Disclosure Package and the Prospectus under the heading "Use of Proceeds".

(k) *No Stabilization.* Neither the Company nor its affiliates will take, directly or indirectly, any action designed to or that could reasonably be expected to cause or result in any stabilization or manipulation of the price of the Stock.

(l) *Exchange Listing.* The Company will use its reasonable best efforts to list, subject to notice of issuance, the Shares on the Nasdaq Market.

(m) *Reports.* During a period of three years from the date of this Agreement, the Company will furnish to the Representatives, as soon as commercially reasonable after the date they are available, copies of all reports or other communications (financial or other) furnished to holders of the Shares, and copies of any reports and financial statements furnished to or filed with the Commission or any national securities exchange or automatic quotation system; provided the Company will be deemed to have furnished such reports and financial statements to the Representatives to the extent they are filed on the Commission's Electronic Data Gathering, Analysis, and Retrieval system.

(n) *Record Retention*. The Company will, pursuant to reasonable procedures developed in good faith, retain copies of each Issuer Free Writing Prospectus that is not filed with the Commission in accordance with Rule 433 under the Securities Act.

(o) *Filings.* The Company will file with the Commission such reports as may be required by Rule 463 under the Securities Act.

(p) *Emerging Growth Company*. The Company will promptly notify the Representatives if the Company ceases to be an Emerging Growth Company at any time prior to

the later of (i) completion of the distribution of Shares within the meaning of the Securities Act and (ii) completion of the 180-day restricted period referred to in Section 4(h) hereof.

(q) *Certification Regarding Beneficial Ownership*. The Company will deliver to each Underwriter (or its agent), on or prior to the date of execution of this Agreement, a properly completed and executed Certification Regarding Beneficial Owners of Legal Entity Customers, together with copies of identifying documentation, and the Company undertakes to provide such additional supporting documentation as each Underwriter may reasonably request with the verification of the foregoing Certification.

5. Certain Agreements of the Underwriters. Each Underwriter hereby represents and agrees that:

(a) It has not used, authorized use of, referred to or participated in the planning for use of, and will not use, authorize use of, refer to or participate in the planning for use of, any "free writing prospectus", as defined in Rule 405 under the Securities Act (which term includes use of any written information furnished to the Commission by the Company and not incorporated by reference into the Registration Statement and any press release issued by the Company) other than (i) a free writing prospectus that contains no "issuer information" (as defined in Rule 433(h)(2) under the Securities Act) that was not included (including through incorporation by reference) in the Preliminary Prospectus or a previously filed Issuer Free Writing Prospectus, (ii) any Issuer Free Writing Prospectus listed on Annex A or prepared pursuant to Section 3(c) or Section 4(c) above (including any electronic road show), or (iii) any free writing prospectus prepared by such Underwriter and approved by the Company in advance in writing.

(b) It has not and will not, without the prior written consent of the Company, use any free writing prospectus that contains the final terms of the Shares unless such terms have previously been included in a free writing prospectus filed with the Commission; *provided* that Underwriters may use a term sheet substantially in the form of Annex D hereto without the consent of the Company; *provided further* that any Underwriter using such term sheet shall notify the Company, and provide a copy of such term sheet to the Company, prior to, or substantially concurrently with, the first use of such term sheet.

(c) It is not subject to any pending proceeding under Section 8A of the Securities Act with respect to the offering (and will promptly notify the Company if any such proceeding against it is initiated during the Prospectus Delivery Period).

6. Conditions of Underwriters' Obligations. The obligation of each Underwriter to purchase the Underwritten Shares on the Closing Date or the Option Shares on the Additional Closing Date, as the case may be, as provided herein is subject to the performance by the Company of its covenants and other obligations hereunder and to the following additional conditions:

(a) *Registration Compliance; No Stop Order.* No order suspending the effectiveness of the Registration Statement shall be in effect, and no proceeding for such purpose or pursuant to Section 8A under the Securities Act shall be pending before or threatened by the Commission; the Prospectus and each Issuer Free Writing Prospectus shall have been timely filed with the Commission under the Securities Act (in the case of an Issuer Free Writing Prospectus, to the extent required by Rule 433 under the Securities Act) and in accordance with Section 4(a) hereof; and all requests by the Commission for additional information shall have been complied with to the reasonable satisfaction of the Representatives.

(b) *Representations and Warranties.* The representations and warranties of the Company contained herein shall be true and correct on the date hereof and on and as of the Closing Date or the Additional Closing Date, as the case may be; and the statements of the Company and its officers made in any certificates delivered pursuant to this Agreement shall be true and correct on and as of the Closing Date or the Additional Closing Date, as the case may be.

(c) *No Material Adverse Change.* No event or condition of a type described in Section 3(h) hereof shall have occurred or shall exist, which event or condition is not described in the Pricing Disclosure Package (excluding any amendment or supplement thereto) and the Prospectus (excluding any amendment or supplement thereto) and the effect of which in the judgment of the Representatives makes it impracticable or inadvisable to proceed with the offering, sale or delivery of the Shares on the Closing Date or the Additional Closing Date, as the case may be, on the terms and in the manner contemplated by this Agreement, the Pricing Disclosure Package and the Prospectus.

(d) *Officer's Certificate.* The Representatives shall have received on and as of the Closing Date or the Additional Closing Date, as the case may be, a certificate of the chief financial officer or chief accounting officer of the Company and one additional senior executive officer of the Company who is satisfactory to the Representatives, on behalf of the Company and not in their individual capacities (i) confirming that such officers have carefully reviewed the Registration Statement, the Pricing Disclosure Package and the Prospectus and, to the knowledge of such officers, the representations set forth in Sections 3(b) and 3(d) hereof are true and correct, (ii) confirming that the other representations and warranties of the Company in this Agreement are true and correct and that the Company has complied in all material respects with all agreements and satisfied all conditions on its part to be performed or satisfied hereunder at or prior to the Closing Date or the Additional Closing Date, as the case may be, and (iii) to the effect set forth in paragraphs (a), (b) and (c) above.

(e) *Comfort Letters.* On the date of this Agreement and on the Closing Date or the Additional Closing Date, as the case may be, Deloitte LLP shall have furnished to the Representatives, at the request of the Company, letters, dated the respective dates of delivery thereof and addressed to the Underwriters, in form and substance reasonably satisfactory to the Representatives, containing statements and information of the type customarily included in accountants' "comfort letters" to underwriters with respect to the financial statements and certain financial information contained in each of the Registration Statement, the Pricing Disclosure Package and the Prospectus; provided, that the letter delivered on the Closing Date or the Additional Closing Date, as the case may be, shall use a "cut-off" date no more than three business days prior to such Closing Date or such Additional Closing Date, as the case may be.

(f) *Opinion and Negative Assurance Letter of Counsel for the Company.* Latham & Watkins LLP, counsel for the Company, shall have furnished to the Representatives, at the request of the Company, their written opinion and negative assurance letter, dated the Closing Date or the Additional Closing Date, as the case may be, and addressed to the Underwriters, in form and substance reasonably satisfactory to the Representatives, to the effect set forth in Annex B-1 hereto.

(g) *Opinion and Negative Assurance Letter of Counsel for the Company.* Smith, Anderson, Blount, Dorsett, Mitchell & Jernigan, LLP, counsel for the Company, shall have furnished to the Representatives, at the request of the Company, their written opinion and negative assurance letter, dated the Closing Date or the Additional Closing Date, as the case may be, and addressed to the Underwriters, in form and substance reasonably satisfactory to the Representatives, to the effect set forth in Annex B-2 hereto.

(h) *Opinion of Intellectual Property Counsel for the Company*. Wolf, Greenfield & Sacks, P.C., intellectual property counsel for the Company, shall have furnished to the Representatives, at the request of the Company, their written opinion, dated the Closing Date or the Additional Closing Date, as the case may be, and addressed to the Underwriters, in form and substance reasonably satisfactory to the Representatives, to the effect set forth in Annex B-3 hereto.

(i) *Opinion of Regulatory Counsel for the Company*. Latham & Watkins LLP, regulatory counsel for the Company, shall have furnished to the Representatives, at the request of the Company, their written opinion, dated the Closing Date or the Additional Closing Date, as the case may be, and addressed to the Underwriters, in form and substance reasonably satisfactory to the Representatives, to the effect set forth in Annex B-4 hereto.

(j) *Opinion and Negative Assurance Letter of Counsel for the Underwriters.* The Representatives shall have received on and as of the Closing Date or the Additional Closing Date, as the case may be, an opinion and negative assurance letter of Cooley LLP, counsel for the Underwriters, with respect to such matters as the Representatives may reasonably request, and such counsel shall have received such documents and information as they may reasonably request to enable them to pass upon such matters.

(k) *No Legal Impediment to Issuance and Sale.* No action shall have been taken and no statute, rule, regulation or order shall have been enacted, adopted or issued by any federal, state or foreign governmental or regulatory authority that would, as of the Closing Date or the Additional Closing Date, as the case may be, prevent the issuance or sale of the Shares; and no injunction or order of any federal, state or foreign court shall have been issued that would, as of the Closing Date or the Additional Closing Date, as the case may be, prevent the issuance or sale of the Shares.

(l) *Good Standing*. The Representatives shall have received on and as of the Closing Date or the Additional Closing Date, as the case may be, satisfactory evidence of the good standing of the Company and its subsidiaries in their respective jurisdictions of organization and their good standing as foreign entities in such other jurisdictions as the Representatives may reasonably request, in each case in writing or any standard form of telecommunication from the appropriate governmental authorities of such jurisdictions.

(m) *Exchange Listing.* The Shares to be delivered on the Closing Date or the Additional Closing Date, as the case may be, shall have been approved for listing on the Nasdaq Market, subject to official notice of issuance.

(n) *Lock-up Agreements*. The “lock-up” agreements, each substantially in the form of Exhibit A hereto, between you and substantially all of the securityholders, officers and directors of the Company relating to sales and certain other dispositions of shares of Stock or certain other securities, delivered to you on or before the date hereof, shall be full force and effect on the Closing Date or the Additional Closing Date, as the case may be.

(o) *Additional Documents.* On or prior to the Closing Date or the Additional Closing Date, as the case may be, the Company shall have furnished to the Representatives such further certificates and documents as the Representatives may reasonably request.

All opinions, letters, certificates and evidence mentioned above or elsewhere in this Agreement shall be deemed to be in compliance with the provisions hereof only if they are in form and substance reasonably satisfactory to counsel for the Underwriters.

7. Indemnification and Contribution.

(a) *Indemnification of the Underwriters.* The Company agrees to indemnify and hold harmless each Underwriter, its affiliates, directors and officers and each person, if any, who controls such Underwriter within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act, from and against any and all losses, claims, damages and liabilities (including, without limitation, legal fees and other expenses incurred in connection with any suit, action or proceeding or any claim asserted, as such fees and expenses are incurred), joint or several, that arise out of, or are based upon, (i) any untrue statement or alleged untrue statement of a material fact contained in the Registration Statement or caused by any omission or alleged omission to state therein a material fact required to be stated therein or necessary in order to make the statements therein, not misleading, or (ii) any untrue statement or alleged untrue statement of a material fact contained in the Prospectus (or any amendment or supplement thereto), any Preliminary Prospectus, any Issuer Free Writing Prospectus, any "issuer information" filed or required to be filed pursuant to Rule 433(d) under the Securities Act, any Written Testing-the-Waters Communication, any road show as defined in Rule 433(h) under the Securities Act (a "road show") or any Pricing Disclosure Package (including any Pricing Disclosure Package that has subsequently been amended), or caused by any omission or alleged omission to state therein a material fact necessary in order to make the statements therein, in light of the circumstances under which they were made, not misleading, in each case except insofar as such losses, claims, damages or liabilities arise out of, or are based upon, any untrue statement or omission or alleged untrue statement or omission made in reliance upon and in conformity with any information relating to any Underwriter furnished to the Company in writing by such Underwriter through the Representatives expressly for use therein, it being understood and agreed that the only such information furnished by any Underwriter consists of the information described as such in subsection (b) below.

(b) *Indemnification of the Company.* Each Underwriter agrees, severally and not jointly, to indemnify and hold harmless the Company, its directors, its officers who signed the Registration Statement and each person, if any, who controls the Company within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act to the same extent as the indemnity set forth in paragraph (a) above, but only with respect to any losses, claims, damages or liabilities that arise out of, or are based upon, any untrue statement or omission or alleged untrue statement or omission made in reliance upon and in conformity with any information relating to such Underwriter furnished to the Company in writing by such Underwriter through the Representatives expressly for use in the Registration Statement, the Prospectus (or any amendment or supplement thereto), any Preliminary Prospectus, any Issuer Free Writing Prospectus, any Written Testing-the-Waters Communication, any road show or any Pricing Disclosure Package (including any Pricing Disclosure Package that has subsequently been amended), it being understood and agreed upon that the only such information furnished by any Underwriter consists of the following information in the Prospectus furnished on behalf

of each Underwriter: the concession and reallowance figures appearing in the [●] paragraph under the caption "Underwriting" and the information contained in the [●] paragraph under the caption "Underwriting.

(c) *Notice and Procedures.* If any suit, action, proceeding (including any governmental or regulatory investigation), claim or demand shall be brought or asserted against any person in respect of which indemnification may be sought pursuant to the preceding paragraphs of this Section 9, such person (the "Indemnified Person") shall promptly notify the person against whom such indemnification may be sought (the "Indemnifying Person") in writing; provided that the failure to notify the Indemnifying Person shall not relieve it from any liability that it may have under the preceding paragraphs of this Section 9 except to the extent that it has been materially prejudiced (through the forfeiture of substantive rights or defenses) by such failure; and provided, further, that the failure to notify the Indemnifying Person shall not relieve it from any liability that it may have to an Indemnified Person otherwise than under the preceding paragraphs of this Section 9. If any such proceeding shall be brought or asserted against an Indemnified Person and it shall have notified the Indemnifying Person thereof, the Indemnifying Person shall retain counsel reasonably satisfactory to the Indemnified Person (who shall not, without the consent of the Indemnified Person, be counsel to the Indemnifying Person) to represent the Indemnified Person and any others entitled to indemnification pursuant to this Section that the Indemnifying Person may designate in such proceeding and shall pay the reasonable and documented fees and expenses in such proceeding and shall pay the reasonable and documented fees and expenses of such counsel related to such proceeding, as incurred. In any such proceeding, any Indemnified Person shall have the right to retain its own counsel, but the fees and expenses of such counsel shall be at the expense of such Indemnified Person unless (i) the Indemnifying Person and the Indemnified Person shall have mutually agreed to the contrary; (ii) the Indemnifying Person has failed within a reasonable time to retain counsel reasonably satisfactory to the Indemnified Person; (iii) the Indemnified Person shall have reasonably concluded that there may be legal defenses available to it that are different from or in addition to those available to the Indemnifying Person; or (iv) the named parties in any such proceeding (including any impleaded parties) include both the Indemnifying Person and the Indemnified Person and representation of both parties by the same counsel would be inappropriate due to actual or potential differing interest between them. It is understood and agreed that the Indemnifying Person shall not, in connection with any proceeding or related proceedings in the same jurisdiction, be liable for the fees and expenses of more than one separate firm (in addition to any local counsel) for all Indemnified Persons, and that all such fees and expenses shall be paid or reimbursed as they are incurred. Any such separate firm for any Underwriter, its affiliates, directors and officers and any control persons of such Underwriter shall be designated in writing by J.P. Morgan Securities LLC and any such separate firm for the Company, its directors, its officers who signed the Registration Statement and any control persons of the Company shall be designated in writing by the Company. The Indemnifying Person shall not be liable for any settlement of any proceeding effected without its written consent, but if settled with such consent, the Indemnifying Person agrees to indemnify each Indemnified Person from and against any loss or liability by reason of such settlement. Notwithstanding the foregoing sentence, if at any time an Indemnified Person shall have requested that an Indemnifying Person reimburse the Indemnified Person for fees and expenses of counsel as contemplated by this paragraph, the Indemnifying Person shall be liable for any settlement of any proceeding effected without its written consent if (i) such settlement is entered into more than 30 days after receipt by the Indemnifying Person of such request and (ii) the Indemnifying Person shall not have reimbursed the Indemnified Person in accordance with such request prior to the date of such settlement. No Indemnifying Person shall, without the written consent of the Indemnified Person, effect any settlement of any pending or threatened proceeding in respect of which any Indemnified Person is or could have been a party and indemnification could have been sought hereunder by such Indemnified Person, unless such settlement (x) includes an unconditional release of such Indemnified Person, in form and substance

reasonably satisfactory to such Indemnified Person, from all liability on claims that are the subject matter of such proceeding and (y) does not include any statement as to or any admission of fault, culpability or a failure to act by or on behalf of any Indemnified Person.

(d) *Contribution.* If the indemnification provided for in paragraphs (a) and (b) above is unavailable to an Indemnified Person or insufficient in respect of any losses, claims, damages or liabilities referred to therein, then each Indemnifying Person under such paragraph, in lieu of indemnifying such Indemnified Person thereunder, shall contribute to the amount paid or payable by such Indemnified Person as a result of such losses, claims, damages or liabilities (i) in such proportion as is appropriate to reflect the relative benefits received by the Company, on the one hand, and the Underwriters on the other, from the offering of the Shares or (ii) if the allocation provided by clause (i) is not permitted by applicable law, in such proportion as is appropriate to reflect not only the relative benefits referred to in clause (i) but also the relative fault of the Company, on the one hand, and the Underwriters on the other, in connection with the statements or omissions that resulted in such losses, claims, damages or liabilities, as well as any other relevant equitable considerations. The relative benefits received by the Company, on the one hand, and the Underwriters on the other, shall be deemed to be in the same respective proportions as the net proceeds (before deducting expenses) received by the Company from the sale of the Shares and the total underwriting discounts and commissions received by the Underwriters in connection therewith, in each case as set forth in the table on the cover of the Prospectus, bear to the aggregate offering price of the Shares. The relative fault of the Company, on the one hand, and the Underwriters on the other, shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or the omission or alleged omission to state a material fact relates to information supplied by the Company or by the Underwriters and the parties' relative intent, knowledge, access to information and opportunity to correct or prevent such statement or omission.

(e) *Limitation on Liability.* The Company and the Underwriters agree that it would not be just and equitable if contribution pursuant to paragraph (d) above were determined by pro rata allocation (even if the Underwriters were treated as one entity for such purpose) or by any other method of allocation that does not take account of the equitable considerations referred to in paragraph (d) above. The amount paid or payable by an Indemnified Person as a result of the losses, claims, damages and liabilities referred to in paragraph (d) above shall be deemed to include, subject to the limitations set forth above, any legal or other expenses incurred by such Indemnified Person in connection with any such action or claim. Notwithstanding the provisions of paragraphs (d) and (e), in no event shall an Underwriter be required to contribute any amount in excess of the amount by which the total underwriting discounts and commissions received by such Underwriter with respect to the offering of the Shares exceeds the amount of any damages that such Underwriter has otherwise been required to pay by reason of such untrue or alleged untrue statement or omission or alleged omission. No person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any person who was not guilty of such fraudulent misrepresentation. The Underwriters' obligations to contribute pursuant to paragraphs (d) and (e) are several in proportion to their respective purchase obligations hereunder and not joint.

(f) *Non-Exclusive Remedies.* The remedies provided for in this Section 7 are not exclusive and shall not limit any rights or remedies which may otherwise be available to any Indemnified Person at law or in equity.

8. Effectiveness of Agreement. This Agreement shall become effective as of the date first written above.

9. Termination. This Agreement may be terminated in the absolute discretion of the Representatives, by notice to the Company, if after the execution and delivery of this Agreement and on or prior to the Closing Date or, in the case of the Option Shares, prior to the Additional Closing Date: (i) trading generally shall have been suspended or materially limited on or by any of the New York Stock Exchange or The Nasdaq Stock Market; (ii) trading of any securities issued or guaranteed by the Company shall have been suspended on any exchange or in any over-the-counter market; (iii) a general moratorium on commercial banking activities shall have been declared by federal or New York State authorities; or (iv) there shall have occurred any outbreak or escalation of hostilities or any change in financial markets or any calamity or crisis, either within or outside the United States, that, in the judgment of the Representatives, is material and adverse and makes it impracticable or inadvisable to proceed with the offering, sale or delivery of the Shares on the Closing Date or the Additional Closing Date, as the case may be, on the terms and in the manner contemplated by this Agreement, the Pricing Disclosure Package and the Prospectus.

10. Defaulting Underwriter.

(a) If, on the Closing Date or the Additional Closing Date, as the case may be, any Underwriter defaults on its obligation to purchase the Shares that it has agreed to purchase hereunder on such date, the non-defaulting Underwriters may in their discretion arrange for the purchase of such Shares by other persons satisfactory to the Company on the terms contained in this Agreement. If, within 36 hours after any such default by any Underwriter, the non-defaulting Underwriters do not arrange for the purchase of such Shares, then the Company shall be entitled to a further period of 36 hours within which to procure other persons satisfactory to the non-defaulting Underwriters to purchase such Shares on such terms. If other persons become obligated or agree to purchase the Shares of a defaulting Underwriter, either the non-defaulting Underwriters or the Company may postpone the Closing Date or the Additional Closing Date, as the case may be, for up to five full business days in order to effect any changes that in the opinion of counsel for the Company or counsel for the Underwriters may be necessary in the Registration Statement and the Prospectus or in any other document or arrangement, and the Company agrees to promptly prepare any amendment or supplement to the Registration Statement and the Prospectus that effects any such changes. As used in this Agreement, the term “Underwriter” includes, for all purposes of this Agreement unless the context otherwise requires, any person not listed in Schedule 1 hereto that, pursuant to this Section 10, purchases Shares that a defaulting Underwriter agreed but failed to purchase.

(b) If, after giving effect to any arrangements for the purchase of the Shares of a defaulting Underwriter or Underwriters by the non-defaulting Underwriters and the Company as provided in paragraph (a) above, the aggregate number of Shares that remain unpurchased on the Closing Date or the Additional Closing Date, as the case may be, does not exceed one-eleventh of the aggregate number of Shares to be purchased on such date, then the Company shall have the right to require each non-defaulting Underwriter to purchase the number of Shares that such Underwriter agreed to purchase hereunder on such date plus such Underwriter’s pro rata share (based on the number of Shares that such Underwriter agreed to purchase on such date) of the Shares of such defaulting Underwriter or Underwriters for which such arrangements have not been made.

(c) If, after giving effect to any arrangements for the purchase of the Shares of a defaulting Underwriter or Underwriters by the non-defaulting Underwriters and the Company as provided in paragraph (a) above, the aggregate number of Shares that remain unpurchased on the Closing Date or the Additional Closing Date, as the case may be, exceeds one-eleventh of the aggregate amount of Shares to be purchased on such date, or if the Company shall not exercise the right described in paragraph (b) above, then this Agreement or, with respect to any Additional Closing Date, the obligation of the

Underwriters to purchase Shares on the Additional Closing Date, as the case may be, shall terminate without liability on the part of the non-defaulting Underwriters. Any termination of this Agreement pursuant to this Section 10 shall be without liability on the part of the Company, except that the Company will continue to be liable for the payment of expenses as set forth in Section 11 hereof and except that the provisions of Section 7 hereof shall not terminate and shall remain in effect.

(d) Nothing contained herein shall relieve a defaulting Underwriter of any liability it may have to the Company or any non-defaulting Underwriter for damages caused by its default.

11. Payment of Expenses.

(a) Whether or not the transactions contemplated by this Agreement are consummated or this Agreement is terminated, the Company will pay or cause to be paid all costs and expenses incident to the performance of its obligations hereunder, including without limitation, (i) the costs incident to the authorization, issuance, sale, preparation and delivery of the Shares and any taxes payable in that connection; (ii) the costs incident to the preparation, printing and filing under the Securities Act of the Registration Statement, the Preliminary Prospectus, any Issuer Free Writing Prospectus, any Pricing Disclosure Package and the Prospectus (including all exhibits, amendments and supplements thereto) and the distribution thereof; (iii) the fees and expenses of the Company's counsel and independent accountants; (iv) the fees and expenses incurred in connection with the registration or qualification and determination of eligibility for investment of the Shares under the state or foreign securities or blue sky laws of such jurisdictions as the Representatives may designate and the preparation, printing and distribution of a Blue Sky Memorandum and any "Canadian wrapper" (including the related documented fees and expenses of counsel for the Underwriters in an amount not to exceed $5,000 (excluding filing fees)); (v) the cost of preparing stock certificates; (vi) the costs and charges of any transfer agent and any registrar; (vii) all expenses and application fees incurred in connection with any filing with, and clearance of the offering by, FINRA (including the related documented fees and expenses of counsel for the Underwriters, in an amount not to exceed $35,000 (excluding filing fees)); and (viii) all expenses incurred by the Company in connection with any "road show" presentation to potential investors (provided, however, that the Underwriters and the Company shall each pay 50% of the cost of chartering any aircraft to be used in connection with the road show by both the Company and the Underwriters, and all lodging, commercial airfare and individual expenses of the Underwriters shall be the responsibility of the Underwriters); (ix) all expenses and application fees related to the listing of the Shares on the Nasdaq Market.

(b) If (i) this Agreement is terminated pursuant to Section 9, (ii) the Company for any reason fails to tender the Shares for delivery to the Underwriters or (iii) the Underwriters decline to purchase the Shares for any reason permitted under this Agreement, the Company agrees to reimburse the Underwriters for all out-of-pocket costs and expenses (including the fees and expenses of their counsel) reasonably incurred by the Underwriters in connection with this Agreement and the offering contemplated hereby; provided, however, that no additional amounts beyond what has been reimbursed pursuant to the foregoing will be owed to the Underwriters other than under Section 7 hereof. For the avoidance of doubt, it is understood that the Company shall not pay or reimburse any costs, fees or expenses incurred by any Underwriter that defaults on its obligations to purchase the Shares.

12. Persons Entitled to Benefit of Agreement. This Agreement shall inure to the benefit of and be binding upon the parties hereto and their respective successors and the officers and directors and any controlling persons referred to herein, and the affiliates of each Underwriter referred to in Section 7 hereof. Nothing in this Agreement is intended or shall be construed to give any other person any legal or equitable right, remedy or claim under or in respect of this Agreement or any provision contained herein. No purchaser of Shares from any Underwriter shall be deemed to be a successor merely by reason of such purchase.

13. Survival. The respective indemnities, rights of contribution, representations, warranties and agreements of the Company and the Underwriters contained in this Agreement or made by or on behalf of the Company or the Underwriters pursuant to this Agreement or any certificate delivered pursuant hereto shall survive the delivery of and payment for the Shares and shall remain in full force and effect, regardless of any termination of this Agreement or any investigation made by or on behalf of the Company or the Underwriters or the directors, officers, controlling persons or affiliates referred to in Section 7 hereof.

14. Certain Defined Terms. For purposes of this Agreement, (a) except where otherwise expressly provided, the term "affiliate" has the meaning set forth in Rule 405 under the Securities Act; (b) the term "business day" means any day other than a day on which banks are permitted or required to be closed in New York City; (c) the term "subsidiary" has the meaning set forth in Rule 405 under the Securities Act; and (d) the term "significant subsidiary" has the meaning set forth in Rule 1-02 of Regulation S-X under the Exchange Act. In the event that the Company has only one subsidiary, then all references herein to "subsidiaries" of the Company shall be deemed to refer to such single subsidiary, mutatis mutandis.

15. Compliance with USA Patriot Act. In accordance with the requirements of the USA Patriot Act (Title III of Pub. L. 107-56 (signed into law October 26, 2001)), the Underwriters are required to obtain, verify and record information that identifies their respective clients, including the Company, which information may include the name and address of their respective clients, as well as other information that will allow the Underwriters to properly identify their respective clients.

16. Miscellaneous.

(a) *Notices.* All notices and other communications hereunder shall be in writing and shall be deemed to have been duly given if mailed or transmitted and confirmed by any standard form of telecommunication. Notices to the Underwriters shall be given to the Representatives c/o J.P. Morgan Securities LLC, 383 Madison Avenue, New York, New York 10179 (fax: (212) 622-8358); c/o Goldman Sachs & Co. LLC, 200 West Street, New York, New York 10282, Attention: Control Room; c/o Jefferies, 520 Madison Avenue, New York, New York 10022, Attention: Global Head of Syndicate; and c/o Barclays Capital Inc., 745 Seventh Avenue, New York, New York 10019, Attention: Syndicate Registration; Notices to the Company shall be given to it at Precision BioSciences, Inc., 302 East Pettigrew St., Suite A-100, Durham, North Carolina 27701, (fax: 480-393-5553); Attention: Matthew Kane.

(b) *Governing Law.* This Agreement and any claim, controversy or dispute arising under or related to this Agreement shall be governed by and construed in accordance with the laws of the State of New York applicable to agreements made and to be performed in such state.

(c) *Waiver of Jury Trial*. Each of the parties hereto hereby irrevocably waives, to the fullest extent permitted by applicable law, any and all right to trial by jury in any suit or legal proceeding arising out of or relating to this Agreement or the transactions contemplated hereby.

(d) *Counterparts.* This Agreement may be signed in counterparts (which may include counterparts delivered by any standard form of telecommunication), each of which shall be an original and all of which together shall constitute one and the same instrument.

(e) *Amendments or Waivers.* No amendment or waiver of any provision of this Agreement, nor any consent or approval to any departure therefrom, shall in any event be effective unless the same shall be in writing and signed by the parties hereto.

(f) *Headings.* The headings herein are included for convenience of reference only and are not intended to be part of, or to affect the meaning or interpretation of, this Agreement.

(g) *Integration.* This Agreement supersedes all prior agreements and understandings (whether written or oral) between the Company and the Underwriters, or any of them, with respect to the subject matter hereof.

(h) *Recognition of the U.S. Special Resolution Regimes*.

(i) In the event that any Underwriter that is a Covered Entity becomes subject to a proceeding under a U.S. Special Resolution Regime, the transfer from such Underwriter of this Agreement, and any interest and obligation in or under this Agreement, will be effective to the same extent as the transfer would be effective under the U.S. Special Resolution Regime if this Agreement, and any such interest and obligation, were governed by the laws of the United States or a state of the United States.

(ii) In the event that any Underwriter that is a Covered Entity or a BHC Act Affiliate of such Underwriter becomes subject to a proceeding under a U.S. Special Resolution Regime, Default Rights under this Agreement that may be exercised against such Underwriter are permitted to be exercised to no greater extent than such Default Rights could be exercised under the U.S. Special Resolution Regime if this Agreement were governed by the laws of the United States or a state of the United States.

As used in this Section 16(h):

"BHC Act Affiliate" has the meaning assigned to the term "affiliate" in, and shall be interpreted in accordance with, 12 U.S.C. § 1841(k).

"Covered Entity" means any of the following:

(i) a "covered entity" as that term is defined in, and interpreted in accordance with, 12 C.F.R. § 252.82(b);

(ii) a "covered bank" as that term is defined in, and interpreted in accordance with, 12 C.F.R. § 47.3(b); or

(iii) a "covered FSI" as that term is defined in, and interpreted in accordance with, 12 C.F.R. § 382.2(b).

"Default Right" has the meaning assigned to that term in, and shall be interpreted in accordance with, 12 C.F.R. §§ 252.81, 47.2 or 382.1, as applicable.

"U.S. Special Resolution Regime" means each of (i) the Federal Deposit Insurance Act and the regulations promulgated thereunder and (ii) Title II of the Dodd-Frank Wall Street Reform and Consumer Protection Act and the regulations promulgated thereunder.

[Signature Page Follows]

If the foregoing is in accordance with your understanding, please indicate your acceptance of this Agreement by signing in the space provided below.

Very truly yours,

PRECISION BIOSCIENCES, INC.

By: _____
Name:
Title:

[Signature Page to Underwriting Agreement]

Accepted: As of the date first written above

J. P. MORGAN SECURITIES LLC
GOLDMAN SACHS & CO. LLC
JEFFERIES LLC
BARCLAYS CAPITAL INC.

For themselves and on behalf of the several Underwriters
listed in Schedule 1 hereto.

J.P. MORGAN SECURITIES LLC

By: _____
Authorized Signatory

GOLDMAN SACHS & CO. LLC

By: _____
Authorized Signatory

JEFFERIES LLC

By: _____
Authorized Signatory

BARCLAYS CAPITAL INC.

By: _____
Authorized Signatory

[Signature Page to Underwriting Agreement]

Underwriter	Number of Shares
J.P. Morgan Securities LLC	
Goldman Sachs & Co. LLC	
Jefferies LLC	
Barclays Capital Inc.	
Total	

Significant Subsidiaries

[*Company to provide.*]

a. **Pricing Disclosure Package**

[*list each Issuer Free Writing Prospectus to be included in the Pricing Disclosure Package*]

b. **Pricing Information Provided Orally by Underwriters**

[*set out key information included in script that will be used by Underwriters to confirm sales*]

Form of Opinion of Latham & Watkins LLP

[Provided separately]

Form of Opinion of Smith, Anderson, Blount, Dorsett, Mitchell & Jernigan, LLP

[Provided separately]

Form of Opinion of IP Counsel for the Company

[Provided separately]

Form of Opinion of Regulatory Counsel for the Company

[Provided separately]

Written Testing-the-Waters Communications

[Provided separately]

Annex D

Precision BioSciences, Inc.

Pricing Term Sheet

Exhibit A

FORM OF LOCK-UP AGREEMENT

, 2019

J. P. MORGAN SECURITIES LLC
GOLDMAN SACHS & CO. LLC
JEFFERIES LLC
BARCLAYS CAPITAL INC.

As Representatives of
the several Underwriters listed in
Schedule 1 to the Underwriting
Agreement referred to below

c/o J. P. Morgan Securities LLC
383 Madison Avenue
New York, NY 10179

c/o Goldman Sachs & Co. LLC
200 West Street
New York, NY 10282

c/o Jefferies LLC
520 Madison Avenue
New York, NY 10022

c/o Barclays Capital Inc.
745 Seventh Avenue
New York, NY 10019

Re: Precision BioSciences, Inc. — Initial Public Offering

Ladies and Gentlemen:

The undersigned, a stockholder of Precision BioSciences, Inc., a Delaware corporation (the "Company"), understands that you, as representatives (the "Representatives") of the several Underwriters, propose to enter into an Underwriting Agreement (the "Underwriting Agreement") with the Company, providing for the initial public offering (the "Public Offering") by the several Underwriters named in Schedule 1 to the Underwriting Agreement (the "Underwriters"), of common stock, par value $0.000005 per share ("Common Stock") of the Company (the "Securities"). Capitalized terms used herein and not otherwise defined shall have the meanings set forth in the Underwriting Agreement.

Annex A sets forth definitions for capitalized terms used in this Letter Agreement (as defined below) that are not defined in the body of this Letter Agreement. Those definitions are part of this Letter Agreement.

In consideration of the Underwriters' agreement to purchase and make the Public Offering of the Securities, and for other good and valuable consideration receipt of which is hereby acknowledged, the undersigned hereby agrees that, without the prior written consent of J.P. Morgan Securities LLC, Goldman Sachs & Co. LLC and Jefferies LLC on behalf of the Underwriters, the undersigned will not, during the period beginning on the date of this letter agreement (this "Letter Agreement") and ending 180 days after the date of the prospectus relating to the Public Offering (the "Prospectus") (such period, the "Restricted Period"), (1) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, any shares of Common Stock or any securities convertible into or exercisable or exchangeable for Common Stock (including without limitation, Common Stock or such other securities which may be deemed to be beneficially owned by the undersigned in accordance with the rules and regulations of the Securities and Exchange Commission and securities which may be issued upon exercise of a stock option or warrant), or publicly disclose the intention to make any offer, sale, pledge or disposition, (2) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of the Common Stock or such other securities, whether any such transaction described in clause (1) or (2) above is to be settled by delivery of Common Stock or such other securities, in cash or otherwise or (3) make any demand for or exercise any right with respect to the registration of any shares of Common Stock or any security convertible into or exercisable or exchangeable for Common Stock (and, for the avoidance of doubt, the undersigned hereby waives any and all notice requirements and rights with respect to the registration of any securities pursuant to any agreement, instrument, understanding or otherwise, including any stockholders or registration rights agreement or similar agreement, to which the undersigned is a party or under which the undersigned is entitled to any right or benefit), in each case other than:

(A) the Securities to be sold by the undersigned pursuant to the Underwriting Agreement,

(B) transfers of shares of Common Stock or any security convertible into or exercisable or exchangeable for Common Stock as a bona fide gift or gifts or for bona fide estate planning purposes, including without limitation transfers to charitable organizations,

(C) transfers or distributions of shares of Common Stock or any security convertible into or exercisable or exchangeable for Common Stock to (a) limited partners, members, stockholders or holders of similar equity interests in the undersigned or (b) to another corporation, partnership, limited liability company, trust or other business entity that is an affiliate (as defined in Rule 405 promulgated under the Securities Act) of the undersigned, including without limitation any general partner, limited partner, managing member, manager, member, employee, officer or director of such entity or any trust for the benefit of any of the foregoing or any affiliate of the foregoing, or to any investment fund or other entity controlled or managed by the undersigned or affiliates of the undersigned,

(D) transactions relating to Common Stock or other securities acquired in the Public Offering (other than any issuer-directed shares of Common Stock purchased in the Public Offering by an officer or director of the Company) or open market transactions after the completion of the Public Offering, provided that no public disclosure or filing under Section 16(a) of the Exchange Act will be required or will be voluntarily made during the Restricted Period in connection with subsequent sales of Common Stock or other securities acquired in the Public Offering or such open market transactions during the Restricted Period,

(E) (i) transfers or dispositions of Common Stock or any security convertible into or exercisable or exchangeable for Common Stock by will or intestacy or (ii) to any Family Member or to a trust whose beneficiaries consist exclusively of one or more of the undersigned and/or a Family Member,

(F) transfers of Common Stock or any security convertible into or exercisable or exchangeable for Common Stock pursuant to a domestic order or negotiated divorce settlement; provided that any required filing under Section 16 of the Exchange Act shall indicate in the footnotes thereto that the filing relates to the circumstances described in this clause and no other public announcement shall be required or shall be made voluntarily in connection with such transfer or disposition; and provided further that in the case of a negotiated divorce settlement, such transferee agrees to be bound by the restrictions on transfer set forth herein,

(G) the exercise of a warrant or the exercise of a stock option granted under a stock incentive plan described in the Prospectus for shares of Common Stock, provided that the underlying Common Stock received by the undersigned shall continue to be subject to the restrictions on transfer set forth in this Letter Agreement; and provided further that no filing under Section 16(a) of the Exchange Act or other public filing, report or announcement shall be voluntarily made during the period beginning on the date hereof and continuing to and including the date that is 30 days after the date of the Prospectus (the "30 Day Period"), and after the 30 Day Period, if required, any public report or filing under Section 16 of the Exchange Act shall clearly indicate in the footnotes thereto that the filing relates to such conversion or exercise, that no Common Stock was sold by the reporting person and that Common Stock so received is subject to this Letter Agreement with the underwriters of the Public Offering,

(H) transfers or dispositions of shares of Common Stock or other securities to the Company in connection with the conversion of any convertible preferred stock into, shares of Common Stock; provided that any such shares of Common Stock received by the undersigned shall be subject to the terms of this agreement,

(I) transfers or dispositions of restricted stock to the Company pursuant to any contractual arrangement in effect on the date of this Letter Agreement and described in the Prospectus that provides for the repurchase of the undersigned's Common Stock in connection with the termination of services to the Company; provided, no filing under Section 16(a) of the Exchange Act or other public filing, report or announcement reporting a reduction in beneficial ownership of shares of Common Stock shall be required or shall be voluntarily made during the 30 Day Period, and after the 30 day period, if the undersigned is required to file a report under Section 16(a) of the Exchange Act reporting a reduction in beneficial ownership of shares of Common Stock during the Restricted Period, the undersigned shall clearly indicate in the footnotes thereto that the filing relates to the termination of the undersigned's employment or other services,

(J) the disposition of Common Stock to the Company, or the withholding of Common Stock by the Company, in a transaction exempt from Section 16(b) of the Exchange Act solely in connection with the payment of taxes due with respect to the vesting of restricted stock granted under a stock incentive plan or pursuant to a contractual employment arrangement described in the Prospectus, insofar as such restricted stock is outstanding as of the date of the Prospectus; and provided further that no filing under Section 16(a) of the Exchange Act or other public filing, report or announcement shall be voluntarily made during 30 Day Period, and after the 30 Day Period, if required, any public report or filing under Section 16 of the Exchange Act shall clearly indicate in the footnotes thereto that the filing relates to such disposition relates to the payment of taxes due with respect to such vesting of restricted stock,

(K) the establishment of a trading plan pursuant to Rule 10b5-1 under the Exchange Act for the transfer of Common Stock, provided that (a) such plan does not provide for the transfer of Common Stock during the Restricted Period and (b) the entry into such plan is not publicly disclosed, included in any filings under the Exchange Act, during the Restricted Period, and

(L) pursuant to a bona fide third party tender offer for all outstanding Common Stock of the Company, merger, consolidation or other similar transaction approved by the Company's Board of Directors and made to all holders of the Company's securities involving a Change of Control of the Company (including, without limitation, the entering into of any lock-up, voting or similar agreement pursuant to which the undersigned may agree to transfer, sell, tender or otherwise dispose of Common Stock or other such securities in connection with such transaction, or vote any Common Stock or other such securities in favor of any such transaction), provided that in the event that such tender offer, merger, consolidation or other such transaction is not completed, such securities held by the undersigned shall remain subject to the provisions of this Letter Agreement;

provided that in the case of any transfer or distribution pursuant to clause (B), (C) or (E), each donee or distributee shall execute and deliver to the Representative a lock-up letter in the form of this letter agreement; and provided, further, that in the case of any transfer or distribution pursuant to clause (B), (C) or E(ii), no filing by any party (donor, donee, transferor or transferee) under the Exchange Act or other public announcement shall be required or shall be made voluntarily in connection with such transfer or distribution (other than a filing on a Form 5 made after the expiration of the Restricted Period referred to above); and provided further, in the case of clauses (C) and E(ii), any such transfer shall not involve a disposition for value. If the undersigned is an officer or director of the Company, the undersigned further agrees that the foregoing provisions shall be equally applicable to any Company-directed Securities the undersigned may purchase in the Public Offering.

If the undersigned is an officer or director of the Company, (i) J.P. Morgan Securities LLC, Goldman Sachs & Co. LLC and Jefferies LLC on behalf of the Underwriters agree that, at least three business days before the effective date of any release or waiver of the foregoing restrictions in connection with a transfer of shares of Common Stock, J.P. Morgan Securities LLC, Goldman Sachs & Co. LLC and Jefferies LLC on behalf of the Underwriters will notify the Company of the impending release or waiver, and (ii) the Company has agreed in the Underwriting Agreement to announce the impending release or waiver by press release through a major news service at least two business days before the effective date of the release or waiver. Any release or waiver granted by J.P. Morgan Securities LLC, Goldman Sachs & Co. LLC and Jefferies LLC on behalf of the Underwriters hereunder to any such officer or director shall only be effective two business days after the publication date of such press release. The provisions of this paragraph will not apply if (a) the release or waiver is effected solely to permit a transfer not for consideration and (b) the transferee has agreed in writing to be bound by the same terms described in this letter to the extent and for the duration that such terms remain in effect at the time of the transfer.

In furtherance of the foregoing, the Company, and any duly appointed transfer agent for the registration or transfer of the securities described herein, are hereby authorized to decline to make any transfer of securities if such transfer would constitute a violation or breach of this Letter Agreement.

The undersigned hereby represents and warrants that the undersigned has full power and authority to enter into this Letter Agreement. All authority herein conferred or agreed to be conferred and any obligations of the undersigned shall be binding upon the successors, assigns, heirs or personal representatives of the undersigned.

The undersigned understands that, if (i) either the Company or the Representatives notifies the other in writing prior to the execution of the Underwriting Agreement that it does not intend to proceed with the Public Offering, (ii) the Underwriting Agreement does not become effective by June 30, 2019, (iii) if the Underwriting Agreement (other than the provisions thereof which survive termination) shall terminate or be terminated prior to payment for and delivery of the Common Stock to be sold thereunder or (iv) the registration statement filed with the Securities and Exchange Commission in connection with the Public Offering is withdrawn, the undersigned shall be released from, all obligations under this Letter Agreement. The undersigned understands that the Underwriters are entering into the Underwriting Agreement and proceeding with the Public Offering in reliance upon this Letter Agreement.

[*Signature Page Follows*]

This Letter Agreement and any claim, controversy or dispute arising under or related to this Letter Agreement shall be governed by and construed in accordance with the laws of the State of New York, without regard to the conflict of laws principles thereof.

Very truly yours,

_____

Name of Security Holder *(Print exact name)*

By: _____

Signature

If not signing in an individual capacity:

_____

Name of Authorized Signatory *(Print)*

_____

Title of Authorized Signatory *(Print)*

(indicate capacity of person signing if signing as custodian, trustee, or on behalf of an entity)

Annex A

Certain Defined Terms Used in this Lock-up Agreement

For purposes of this Letter Agreement to which this Annex A is attached and of which it is made a part:

"Change of Control" means the consummation of any bona fide third party tender offer, merger, consolidation or other similar transaction, the result of which is that any "person" (as defined in Section 13(d)(3) of the Exchange Act), or group of persons, other than the Company or its subsidiaries, becomes the beneficial owner (as defined in Rules 13d-3 and 13d-5 of the Exchange Act) of at least 50% of the total voting power of the voting share capital of the Company.

"Exchange Act" shall mean the Securities Exchange Act of 1934, as amended.

"Family Member" shall mean the spouse of the undersigned, an immediate family member of the undersigned or an immediate family member of the undersigned's spouse, in each case living in the undersigned's household or whose principal residence is the undersigned's household (regardless of whether such spouse or family member may at the time be living elsewhere due to educational activities, health care treatment, military service, temporary internship or employment or otherwise). "Immediate family member" as used above shall have the meaning set forth in Rule 16a-1(e) under the Exchange Act.

"Securities Act" shall mean the Securities Act of 1933, as amended.

Capitalized terms not defined in this Annex A shall have the meanings given to them in the body of this lock-up agreement.

Exhibit B

Form of Waiver of Lock-up

J.P. MORGAN SECURITIES LLC GOLDMAN SACHS & CO. LLC JEFFERIES LLC
Precision BioSciences, Inc.
Public Offering of Common Stock

, 2019

[Name and Address of
Officer or Director
Requesting Waiver]

Dear Mr./Ms. [Name]:

This letter is being delivered to you in connection with the offering by Precision BioSciences, Inc. (the "Company") of shares of common stock, $[•] par value per share (the "Common Stock"), of the Company and the lock-up letter dated , 20 (the "Lock-up Letter"), executed by you in connection with such offering, and your request for a [waiver] [release] dated , 2019 with respect to shares of Common Stock (the "Shares").

J.P. Morgan Securities LLC, Goldman Sachs & Co. LLC and Jefferies LLC hereby agree to [waive] [release] the transfer restrictions set forth in the Lock-up Letter, but only with respect to the Shares, effective , 2019; provided, however, that such [waiver] [release] is conditioned on the Company announcing the impending [waiver] [release] by press release through a major news service at least two business days before effectiveness of such [waiver] [release]. This letter will serve as notice to the Company of the impending [waiver] [release].

Except as expressly [waived] [released] hereby, the Lock-up Letter shall remain in full force and effect.

Yours very truly,

J.P. MORGAN SECURITIES LLC

By: _____
Name:
Title:

GOLDMAN SACHS & CO. LLC

By: _____
Name:
Title:

JEFFERIES LLC

By: _____
Name:
Title:

cc: Company

Form of Press Release

Precision BioSciences, Inc.
[Date]

Precision BioSciences, Inc. (the "Company") announced today that J.P. Morgan Securities LLC, Goldman Sachs & Co. LLC, Jefferies LLC and Barclays Capital Inc., the joint book-running managers in the Company's recent public sale of shares of common stock, are [waiving] [releasing] a lock-up restriction with respect to shares of the Company's common stock held by [certain officers or directors] [an officer or director] of the Company. The [waiver] [release] will take effect on , 20 , and the shares may be sold on or after such date.

This press release is not an offer for sale of the securities in the United States or in any other jurisdiction where such offer is prohibited, and such securities may not be offered or sold in the United States absent registration or an exemption from registration under the United States Securities Act of 1933, as amended.

Precision BioSciences, Inc.
Testing the Waters Authorization Letter

December 17, 2018

J.P. Morgan Securities LLC
Goldman Sachs & Co. LLC
Jefferies LLC
Barclays Capital Inc.

c/o J. P. Morgan Securities LLC
383 Madison Avenue
New York, NY 10179

c/o Goldman Sachs & Co. LLC
200 West Street
New York, NY 10282

c/o Jefferies LLC
520 Madison Avenue
New York, NY 10022

c/o Barclays Capital Inc.
745 Seventh Avenue
New York, NY 10019

In reliance on Section 5(d) of the Securities Act of 1933, as amended (the "Act"), Precision BioSciences, Inc., a Delaware corporation (the "Issuer"), hereby authorizes J.P. Morgan Securities LLC ("J.P. Morgan"), Goldman Sachs & Co. LLC ("Goldman Sachs"), Jefferies LLC ("Jefferies"), Barclays Capital Inc. ("Barclays," and together with J.P. Morgan, Goldman Sachs and Jefferies, the "Representatives") and each of their respective affiliates and employees to engage on behalf of the Issuer in oral and written communications with potential investors that are "qualified institutional buyers", as defined in Rule 144A under the Act, or institutions that are "accredited investors", as defined in Regulation D under the Act, to determine whether such investors might have an interest in the Issuer's contemplated initial public offering ("Testing-the-Waters Communications"). A "Written Testing-the-Waters Communication" means any Testing-the-Waters Communication that is a written communication within the meaning of Rule 405 under the Act.

The Issuer represents that it is an "emerging growth company" as defined in Section 2(a)(19) of the Act ("Emerging Growth Company") and agrees to promptly notify the Representatives in writing if the Issuer hereafter ceases to be an Emerging Growth Company while this authorization is in effect. If at any time following the distribution of any Written Testing-the-Waters Communication there occurs an event or development as a result of which such Written Testing-the-Waters Communication included or would include an untrue statement of a material fact or omitted or would omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances existing at that subsequent time, not misleading, the Issuer will promptly notify the Representatives and will promptly amend or supplement, at its own expense, such Written Testing-the-Waters Communication to eliminate or correct such untrue statement or omission.

Nothing in this authorization is intended to limit or otherwise affect the ability of the Representatives and each of their respective affiliates and employees to engage in communications in which they could otherwise lawfully engage in the absence of this authorization, including, without limitation, any written communication containing only one or more of the statements specified under Rule 134(a) under the Act. This authorization shall remain in effect until the Issuer has provided to the Representatives a written notice revoking this authorization. All notices as described herein shall be sent by email to the attention of David Ke (david.ke@jpmorgan.com) at J.P. Morgan, Jack Bannister (jack.bannister@gs.com) at Goldman Sachs, Charles Glazer (cglazer@jefferies.com) at Jefferies and Paul Scansaroli (paul.scansaroli@barclays.com) at Barclays.

[Signature page follows]

Very truly yours,

PRECISION BIOSCIENCES, INC.

By: _____
Name:
Title:

[Signature Page to Authorization Letter]

Exhibit 3.2

AMENDED AND RESTATED CERTIFICATE OF INCORPORATION

OF

PRECISION BIOSCIENCES, INC.

The name of the corporation is Precision BioSciences, Inc., and the corporation was originally incorporated by the filing of its original Certificate of Incorporation with the Secretary of State of the State of Delaware on January 26, 2006. This Amended and Restated Certificate of Incorporation of the corporation (this "Certificate of Incorporation"), which restates and integrates and also further amends the provisions of the corporation's Certificate of Incorporation, was duly adopted in accordance with the provisions of Sections 242 and 245 of the General Corporation Law of the State of Delaware and by the written consent of its stockholders in accordance with Section 228 of the General Corporation Law of the State of Delaware. The Certificate of Incorporation of the corporation is hereby amended, integrated and restated to read in its entirety as follows:

FIRST: The name of the Corporation is Precision BioSciences, Inc.

SECOND: The address of the Corporation's registered office in the State of Delaware is 1209 Orange Street, in the City of Wilmington, County of New Castle, Delaware 19801. The name of its registered agent at that address is The Corporation Trust Company.

THIRD: The nature of the business or purposes to be conducted or promoted by the Corporation is to engage in any lawful act or activity for which corporations may be organized under the General Corporation Law of the State of Delaware.

FOURTH: The total number of shares of all classes of stock which the Corporation shall have authority to issue is 210,000,000 shares, consisting of (a) 200,000,000 shares of Common Stock, $0.000005 par value per share ("Common Stock"), and (b) 10,000,000 shares of Preferred Stock, $0.0001 par value per share ("Preferred Stock").

The following is a statement of the designations and the powers, privileges and rights, and the qualifications, limitations or restrictions thereof in respect of each class of capital stock of the Corporation.

A. COMMON STOCK.

1. General. The voting, dividend and liquidation rights of the holders of the Common Stock are subject to and qualified by the rights of the holders of the Preferred Stock of any series as may be designated by the Board of Directors of the Corporation (the "Board of Directors") upon any issuance of the Preferred Stock of any series.

2. Voting. The holders of the Common Stock shall have voting rights at all meetings of stockholders, each such holder being entitled to one vote for each share thereof held by such holder; provided, however, that, except as otherwise required by law, holders of Common Stock shall not be entitled to vote on any amendment to this Certificate of Incorporation (which, as used herein, shall mean the certificate of incorporation of the Corporation, as amended from time to time, including the terms of any certificate of designations of any series of Preferred Stock) that relates solely to the terms of one or more outstanding series of Preferred Stock if the holders of such affected series are entitled, either separately or together as a class with the holders of one or more other such series, to vote thereon pursuant to this Certificate of Incorporation or the General Corporation Law of the State of Delaware. There shall be no cumulative voting.

The number of authorized shares of Common Stock may be increased or decreased (but not below the number of shares thereof then outstanding) by the affirmative vote of the holders of a majority of the stock of the Corporation entitled to vote, irrespective of the provisions of Section 242(b)(2) of the General Corporation Law of the State of Delaware.

3. Dividends. Dividends may be declared and paid on the Common Stock if, as and when determined by the Board of Directors subject to any preferential dividend or other rights of any then outstanding Preferred Stock and to the requirements of applicable law.

4. Liquidation. Upon the dissolution or liquidation of the Corporation, whether voluntary or involuntary, holders of Common Stock will be entitled to receive all assets of the Corporation available for distribution to its stockholders, subject to any preferential or other rights of any then outstanding Preferred Stock.

B. PREFERRED STOCK.

Preferred Stock may be issued from time to time in one or more series, each of such series to have such terms as stated or expressed herein and in the resolution or resolutions providing for the issue of such series adopted by the Board of Directors as hereinafter provided.

Authority is hereby expressly granted to the Board of Directors from time to time to issue the Preferred Stock in one or more series, and in connection with the creation of any such series, by adopting a resolution or resolutions providing for the issuance of the shares thereof and by filing a certificate of designations relating thereto in accordance with the General Corporation Law of the State of Delaware, to determine and fix the number of shares of such series and such voting powers, full or limited, or no voting powers, and such designations, preferences and relative, participating, optional or other special rights, and qualifications, limitations or restrictions thereof, including without limitation thereof, dividend rights, conversion rights, redemption privileges and liquidation preferences, as shall be stated and expressed in such resolutions, all to the fullest extent now or hereafter permitted by the General Corporation Law of the State of Delaware. The powers, preferences and relative, participating, optional and other special rights of each such series of Preferred Stock, and the qualifications, limitations or restrictions thereof, if any, may differ from those of any and all other series at any time outstanding. Without limiting the generality of the foregoing, the resolution or resolutions providing for the issuance of any series of Preferred Stock may provide that such series shall be superior or rank equally or be junior to any other series of Preferred Stock to the extent permitted by law.

Subject to the rights of the holders of any series of Preferred Stock pursuant to the terms of this Certificate of Incorporation or any resolution or resolutions providing for the issuance of such series of stock adopted by the Board of Directors, the number of authorized shares of Preferred Stock may be increased or decreased (but not below the number of shares thereof then outstanding) by the affirmative vote of the holders of a majority of the stock of the Corporation entitled to vote, irrespective of the provisions of Section 242(b)(2) of the General Corporation Law of the State of Delaware.

FIFTH: Except as otherwise provided herein, the Corporation reserves the right to amend, alter, change or repeal any provision contained in this Certificate of Incorporation, in the manner now or hereafter prescribed by statute and this Certificate of Incorporation, and all rights conferred upon stockholders, directors or any other persons herein are granted subject to this reservation.

SIXTH: In furtherance and not in limitation of the powers conferred upon it by the General Corporation Law of the State of Delaware, and subject to the terms of any series of Preferred Stock, the Board of Directors shall have the power to adopt, amend, alter or repeal the Bylaws of the Corporation. The stockholders may not adopt, amend, alter or repeal the Bylaws of the Corporation, or adopt any provision inconsistent therewith, unless such action is approved, in addition to any other vote required by this Certificate of Incorporation, by the affirmative vote of the holders of at least two-thirds in voting power of the outstanding shares of capital stock of the Corporation entitled to vote thereon. Notwithstanding any other provisions of law, this Certificate of Incorporation or the Bylaws of the Corporation, and notwithstanding the fact that a lesser percentage may be specified by law, the affirmative vote of the holders of at least two-thirds in voting power of the outstanding shares of capital stock of the Corporation entitled to vote thereon shall be required to amend or repeal, or to adopt any provision inconsistent with, this Article SIXTH.

SEVENTH: Except to the extent that the General Corporation Law of the State of Delaware prohibits the elimination or limitation of liability of directors for breaches of fiduciary duty, no director of the Corporation shall be personally liable to the Corporation or its stockholders for monetary damages for any breach of fiduciary duty as a director, notwithstanding any provision of law imposing such liability. No amendment to or repeal of this provision shall apply to or have any effect on the liability or alleged liability of any director of the Corporation for or with respect to any acts or omissions of such director occurring prior to such amendment or repeal. If the General Corporation Law of the State of Delaware is amended to permit further elimination or limitation of the personal liability of directors, then the liability of a director of the Corporation shall be eliminated or limited to the fullest extent permitted by the General Corporation Law of the State of Delaware as so amended.

EIGHTH: This Article EIGHTH is inserted for the management of the business and for the conduct of the affairs of the Corporation.

1. General Powers. The business and affairs of the Corporation shall be managed by or under the direction of the Board of Directors.

2. Number of Directors; Election of Directors. Subject to the rights of holders of any series of Preferred Stock to elect directors, the number of directors of the Corporation shall be established from time to time by the Board of Directors. Election of directors need not be by written ballot, except as and to the extent provided in the Bylaws of the Corporation.

3. Classes of Directors. Subject to the rights of holders of any series of Preferred Stock to elect directors, the Board of Directors shall be and is divided into three classes, designated as Class I, Class II and Class III. Each class shall consist, as nearly as may be possible, of one-third of the total number of directors constituting the entire Board of Directors. The Board of Directors is authorized to assign members of the Board of Directors to Class I, Class II or Class III.

4. Terms of Office. Subject to the rights of holders of any series of Preferred Stock to elect directors, each director shall serve for a term ending on the date of the third annual meeting of stockholders following the annual meeting of stockholders at which such director was elected; provided that each director initially assigned to Class I shall serve for a term expiring at the Corporation's first annual meeting of stockholders held after the effectiveness of this Certificate of Incorporation; each director initially assigned to Class II shall serve for a term expiring at the Corporation's second annual meeting of stockholders held after the effectiveness of this Certificate of Incorporation; and each director initially assigned to Class III shall serve for a term expiring at the Corporation's third annual meeting of stockholders held after the effectiveness of this Certificate of Incorporation; provided further, that the term of each director shall continue until the election and qualification of his or her successor and be subject to his or her earlier death, resignation or removal.

5. Quorum. The greater of (a) a majority of the directors at any time in office and (b) one-third of the number of directors fixed pursuant to Section 2 of this Article EIGHTH shall constitute a quorum of the Board of Directors. If at any meeting of the Board of Directors there shall be less than such a quorum, a majority of the directors present may adjourn the meeting from time to time without further notice other than announcement at the meeting, until a quorum shall be present.

6. Action at Meeting. Every act or decision done or made by a majority of the directors present at a meeting duly held at which a quorum is present shall be regarded as the act of the Board of Directors unless a greater number is required by law or by this Certificate of Incorporation.

7. Removal. Subject to the rights of holders of any series of Preferred Stock, directors of the Corporation may be removed but only for cause and only by the affirmative vote of the holders of at least two-thirds in voting power of the outstanding shares of capital stock of the Corporation entitled to vote at an election of directors.

8. Vacancies. Subject to the rights of holders of any series of Preferred Stock, any vacancy or newly created directorship in the Board of Directors, however occurring, shall be filled only by vote of a majority of the directors then in office, although less than a quorum, or by a sole remaining director and shall not be filled by the stockholders, unless the Board of Directors determines by resolution that any such vacancy or newly created directorship shall be filled by the stockholders. A director elected to fill a vacancy shall hold office until the next election of the class for which such director shall have been chosen, subject to the election and qualification of a successor and to such director's earlier death, resignation or removal.

9. Stockholder Nominations and Introduction of Business, Etc. Advance notice of stockholder nominations for election of directors and other business to be brought by stockholders before a meeting of stockholders shall be given in the manner provided by the Bylaws of the Corporation.

10. Amendments to Article. Notwithstanding any other provisions of law, this Certificate of Incorporation or the Bylaws of the Corporation, and notwithstanding the fact that a lesser percentage may be specified by law, the affirmative vote of the holders of at least two-thirds in voting power of the outstanding shares of capital stock of the Corporation entitled to vote thereon shall be required to amend or repeal, or to adopt any provision inconsistent with, this Article EIGHTH.

NINTH: No action that is required or permitted to be taken by the stockholders of the Corporation at any annual or special meeting of stockholders may be effected by written consent of stockholders in lieu of a meeting. Notwithstanding any other provisions of law, this Certificate of Incorporation or the Bylaws of the Corporation, and notwithstanding the fact that a lesser percentage may be specified by law, the affirmative vote of the holders of at least two-thirds in voting power of the outstanding shares of capital stock of the Corporation entitled to vote thereon shall be required to amend or repeal, or to adopt any provision inconsistent with, this Article NINTH.

TENTH: Subject to the rights of holders of any series of Preferred Stock, special meetings of stockholders for any purpose or purposes may be called at any time only by the Board of Directors, the chairperson of the Board of Directors, the chief executive officer or the president (in the absence of a chief executive officer) of the Corporation, and may not be called by any other person or persons. Business transacted at any special meeting of stockholders shall be limited to the purpose or purposes stated in the notice of meeting. Notwithstanding any other provisions of law, this Certificate of Incorporation or the Bylaws of the Corporation, and notwithstanding the fact that a lesser percentage may be specified by law, the affirmative vote of the holders of at least two-thirds in voting power of the outstanding shares of capital stock of the Corporation entitled to vote thereon shall be required to amend or repeal, or to adopt any provision inconsistent with, this Article TENTH.

ELEVENTH: Unless the Corporation consents in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware shall, to the fullest extent permitted by law, be the sole and exclusive forum for (a) any derivative action or proceeding brought on behalf of the Corporation, (b) any action asserting a claim of breach of fiduciary duty owed by any director, officer, employee or stockholder of the Corporation to the Corporation or the Corporation's stockholders, (c) any action asserting a claim arising pursuant to any provision of the General Corporation Law of the State of Delaware or as to which the General Corporation Law of the State of Delaware confers jurisdiction on the Court of Chancery of the State of Delaware or (d) any action asserting a claim governed by the internal affairs doctrine, in each case subject to said Court of Chancery having personal jurisdiction over the indispensable parties named as defendants therein; provided that the exclusive forum provision will not apply to actions which are vested in the exclusive jurisdiction of a court or forum other than the Court of Chancery of the State of Delaware, or for which the Court of Chancery of the State of Delaware does not have subject matter jurisdiction, including actions brought to enforce any liability or duty created by the Securities Exchange Act of 1934, as amended, or the rules and regulations thereunder; and provided further that, if and only if the Court of Chancery of the State of Delaware dismisses any such action for lack of subject matter jurisdiction, such action may be brought in another state or federal court sitting in the State of Delaware. To the fullest extent permitted by applicable law, any person or entity purchasing or otherwise acquiring or holding any interest in shares of capital stock of the Corporation shall be deemed to have notice of and consented to the provisions of this Article ELEVENTH. Notwithstanding any other provisions of law, this Certificate of Incorporation or the Bylaws of the Corporation, and notwithstanding the fact that a lesser percentage may be specified by law, the affirmative vote of the holders of at least two-thirds in voting power of the outstanding shares of capital stock of the Corporation entitled to vote thereon shall be required to amend or repeal, or to adopt any provision inconsistent with, this Article ELEVENTH. If any provision or provisions of this Article ELEVENTH shall be held to be invalid, illegal or unenforceable as applied to any person or entity or circumstance for any reason whatsoever, then, to the fullest extent permitted by law, the validity, legality and enforceability of such provisions in any other circumstance and of the remaining provisions of this Article ELEVENTH (including, without limitation, each portion of any sentence of this Article ELEVENTH containing any such provision held to be invalid, illegal or unenforceable that is not itself held to be invalid, illegal or unenforceable) and the application of such provision to other persons or entities and circumstances shall not in any way be affected or impaired thereby.

IN WITNESS WHEREOF, this Amended and Restated Certificate of Incorporation, which restates, integrates and amends the certificate of incorporation of the Corporation, and which has been duly adopted in accordance with Sections 228, 242 and 245 of the General Corporation Law of the State of Delaware, has been executed by its duly authorized officer this day of , 2019.

PRECISION BIOSCIENCES, INC.

By: _____

Name: Matthew Kane
Title: President and Chief Executive Officer

Exhibit 3.4

AMENDED AND RESTATED

BYLAWS

OF

PRECISION BIOSCIENCES, INC.

(a Delaware corporation)

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(continued)

AMENDED AND RESTATED BYLAWS
OF
PRECISION BIOSCIENCES, INC.

ARTICLE I - CORPORATE OFFICES

1.1 REGISTERED OFFICE.

The registered office of Precision BioSciences, Inc. (the "Corporation") shall be fixed in the Corporation's certificate of incorporation, as the same may be amended from time to time (the "certificate of incorporation").

1.2 OTHER OFFICES.

The Corporation may have other offices at any place or places, either within or outside the State of Delaware, as the board of directors (the "Board") shall from time to time determine or the business of the Corporation may from time to time require.

ARTICLE II - MEETINGS OF STOCKHOLDERS

2.1 PLACE OF MEETINGS.

Meetings of stockholders shall be held at any place, within or outside the State of Delaware, designated by the Board. The Board may, in its sole discretion, determine that a meeting of stockholders shall not be held at any place, but may instead be held solely by means of remote communication as authorized by Section 211(a) of the General Corporation Law of the State of Delaware (the "DGCL"). In the absence of any such designation or determination, stockholders' meetings shall be held at the Corporation's principal executive office.

2.2 ANNUAL MEETING.

The Board shall designate the date and time of the annual meeting. At the annual meeting, directors shall be elected and other proper business properly brought before the meeting in accordance with Section 2.4 of these bylaws may be transacted.

2.3 SPECIAL MEETING.

A special meeting of the stockholders may be called at any time by the Board, chairperson of the Board, chief executive officer or president (in the absence of a chief executive officer), but such special meetings may not be called by any other person or persons.

No business may be transacted at such special meeting other than the business specified in such notice to stockholders. Nothing contained in this paragraph of this Section 2.3 shall be construed as limiting, fixing, or affecting the time when a meeting of stockholders called by action of the Board may be held.

2.4 ADVANCE NOTICE PROCEDURES FOR BUSINESS BROUGHT BEFORE A MEETING.

(a) At an annual meeting of the stockholders, only such business shall be conducted as shall have been properly brought before the meeting. To be properly brought before an annual meeting, business must be (i) brought before the meeting by the Corporation and specified in the notice of meeting given by or at the direction of the Board, (ii) brought before the meeting by or at the direction of the Board (or a committee thereof) or (iii) otherwise properly brought before the meeting by a stockholder who (A) was a stockholder of record of the Corporation (and, with respect to any beneficial owner, if different, on whose behalf such business is proposed, only if such beneficial owner was the beneficial owner of shares of the Corporation) both at the time of giving the notice provided for in this Section 2.4 and at the time of the meeting, (B) is entitled to vote at the meeting and (C) has complied with this Section 2.4 as to such business. Except for proposals properly made in accordance with Rule 14a-8 under the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder (as so amended and inclusive of such rules and regulations, the "Exchange Act"), and included in the notice of meeting given by or at the direction of the Board, the foregoing clause (iii) shall be the exclusive means for a stockholder to propose business to be brought before an annual meeting of the stockholders. Stockholders shall not be permitted to propose business to be brought before a special meeting of the stockholders, and the only matters that may be brought before a special meeting are the matters specified in the notice of meeting given by or at the direction of the person or persons calling the meeting pursuant to Section 2.3 of these bylaws. Stockholders seeking to nominate persons for election to the Board must comply with Section 2.5 of these bylaws, and this Section 2.4 shall not be applicable to nominations except as expressly provided in Section 2.5 of these bylaws.

(b) Without qualification, for business to be properly brought before an annual meeting by a stockholder pursuant to clause (iii) of the second sentence of Section 2.4(a) of these bylaws, the stockholder must (i) provide Timely Notice (as defined below) thereof in writing and in proper form to the secretary of the Corporation and (ii) provide any updates or supplements to such notice at the times and in the forms required by this Section 2.4. To be timely, a stockholder's notice must be delivered to, or mailed and received by the secretary at, the principal executive offices of the Corporation not less than ninety (90) days nor more than one hundred twenty (120) days prior to the first anniversary of the preceding year's annual meeting; *provided, however*, that (x) if the date of the annual meeting is more than thirty (30) days before or more than sixty (60) days after such anniversary date or (y) with respect to the first annual meeting held after the Company's initial public offering of its shares pursuant to a registration statement on Form S-1, notice by the stockholder to be timely must be so delivered,

or mailed and received, not earlier than the close of business on the one hundred twentieth (120th) day prior to such annual meeting and not later than the later of (A) the close of business on the ninetieth (90th) day prior to such annual meeting and (B) the close of business on the tenth (10th) day following the day on which public disclosure of the date of such annual meeting was first made (such notice within such time periods, "Timely Notice"). In no event shall any adjournment or postponement of an annual meeting or the announcement thereof commence a new time period (or extend any time period) for the giving of Timely Notice as described above.

(c) To be in proper form for purposes of this Section 2.4, a stockholder's notice to the secretary of the Corporation shall set forth:

(i) As to each Proposing Person (as defined below), (A) the name and address of such Proposing Person (including, without limitation, if applicable, the name and address that appear on the Corporation's books and records) and (B) the class or series and number of shares of the Corporation that are, directly or indirectly, owned of record or beneficially owned (within the meaning of Rule 13d-3 under the Exchange Act) by such Proposing Person, except that such Proposing Person shall in all events be deemed to beneficially own any shares of any class or series of the Corporation as to which such Proposing Person has a right to acquire beneficial ownership at any time in the future (the disclosures to be made pursuant to the foregoing clauses (A) and (B) are referred to as "Stockholder Information");

(ii) As to each Proposing Person, (A) any derivative, swap or other transaction or series of transactions engaged in, directly or indirectly, by such Proposing Person, the purpose or effect of which is to give such Proposing Person economic risk similar to ownership of shares of any class or series of the Corporation, including, without limitation, due to the fact that the value of such derivative, swap or other transactions are determined by reference to the price, value or volatility of any shares of any class or series of the Corporation, or which derivative, swap or other transactions provide, directly or indirectly, the opportunity to profit from any increase in the price or value of shares of any class or series of the Corporation ("Synthetic Equity Interests"), which Synthetic Equity Interests shall be disclosed without regard to whether (x) the derivative, swap or other transactions convey any voting rights in such shares to such Proposing Person, (y) the derivative, swap or other transactions are required to be, or are capable of being, settled through delivery of such shares or (z) such Proposing Person may have entered into other transactions that hedge or mitigate the economic effect of such derivative, swap or other transactions, (B) any proxy (other than a revocable proxy or consent given in response to a solicitation made pursuant to, and in accordance with, Section 14(a) of the Exchange Act by way of a solicitation statement filed on Schedule 14A), agreement, arrangement, understanding or relationship pursuant to which such Proposing Person has or

shares a right to vote any shares of any class or series of the Corporation, (C) any agreement, arrangement, understanding or relationship, including, without limitation, any repurchase or similar so-called "stock borrowing" agreement or arrangement, engaged in, directly or indirectly, by such Proposing Person, the purpose or effect of which is to mitigate loss to, reduce the economic risk (of ownership or otherwise) of shares of any class or series of the Corporation by, manage the risk of share price changes for, or increase or decrease the voting power of, such Proposing Person with respect to the shares of any class or series of the Corporation, or which provides, directly or indirectly, the opportunity to profit from any decrease in the price or value of the shares of any class or series of the Corporation ("Short Interests"), (D) any rights to dividends on the shares of any class or series of the Corporation owned beneficially by such Proposing Person that are separated or separable from the underlying shares of the Corporation, (E) any performance related fees (other than an asset based fee) to which such Proposing Person is entitled based on any increase or decrease in the price or value of shares of any class or series of the Corporation, or any Synthetic Equity Interests or Short Interests, if any, (F)(x) if such Proposing Person is not a natural person, the identity of the natural person or persons associated with such Proposing Person responsible for the formulation of and decision to propose the business to be brought before the meeting (such person or persons, the "Responsible Person"), the manner in which such Responsible Person was selected, any fiduciary duties owed by such Responsible Person to the equity holders or other beneficiaries of such Proposing Person, the qualifications and background of such Responsible Person and any material interests or relationships of such Responsible Person that are not shared generally by any other record or beneficial holder of the shares of any class or series of the Corporation and that reasonably could have influenced the decision of such Proposing Person to propose such business to be brought before the meeting, and (y) if such Proposing Person is a natural person, the qualifications and background of such natural person and any material interests or relationships of such natural person that are not shared generally by any other record or beneficial holder of the shares of any class or series of the Corporation and that reasonably could have influenced the decision of such Proposing Person to propose such business to be brought before the meeting, (G) any significant equity interests or any Synthetic Equity Interests or Short Interests in any principal competitor of the Corporation held by such Proposing Persons, (H) any direct or indirect interest of such Proposing Person in any contract with the Corporation, any affiliate of the Corporation or any principal competitor of the Corporation (including, without limitation, in any such case, any employment agreement, collective bargaining agreement or consulting agreement), (I) any pending or threatened litigation in which such Proposing Person is a party or material participant involving the Corporation or any of its officers or directors, or any affiliate of the Corporation, (J) any material transaction occurring during the prior twelve (12) months between such Proposing

Person, on the one hand, and the Corporation, any affiliate of the Corporation or any principal competitor of the Corporation, on the other hand, (K) a summary of any material discussions regarding the business proposed to be brought before the meeting (x) between or among any of the Proposing Persons or (y) between or among any Proposing Person and any other record or beneficial holder of the shares of any class or series of the Corporation (including, without limitation, their names) and (L) any other information relating to such Proposing Person that would be required to be disclosed in a proxy statement or other filing required to be made in connection with solicitations of proxies or consents by such Proposing Person in support of the business proposed to be brought before the meeting pursuant to Section 14(a) of the Exchange Act (the disclosures to be made pursuant to the foregoing clauses (A) through (L) are referred to as "Disclosable Interests"); *provided, however*, that Disclosable Interests shall not include any such disclosures with respect to the ordinary course business activities of any broker, dealer, commercial bank, trust company or other nominee who is a Proposing Person solely as a result of being the stockholder directed to prepare and submit the notice required by these bylaws on behalf of a beneficial owner; and

(iii) As to each item of business that the stockholder proposes to bring before the annual meeting, (A) a reasonably brief description of the business desired to be brought before the annual meeting, the reasons for conducting such business at the annual meeting and any material interest (including, without limitation, as defined in Item 5 of Schedule 14A under the Exchange Act) in such business of (and any anticipated benefit from such business to) each Proposing Person, (B) the text of the proposal or business (including, without limitation, the text of any resolutions proposed for consideration and in the event that such business includes a proposal to amend the bylaws of the Corporation, the language of the proposed amendment), (C) a reasonably detailed description of all agreements, arrangements and understandings between or among any of the Proposing Persons or between or among any Proposing Person and any other person or entity (including, without limitation, their names) in connection with the proposal of such business by such stockholder, (D) a representation that the stockholder is a holder of record of stock of the Corporation entitled to vote at such meeting and intends to appear in person or by proxy at the meeting to propose such business, (E) a representation whether the Proposing Person intends or is part of a group which intends (1) to deliver a proxy statement and/or form of proxy to holders of at least the percentage of the Corporation's outstanding capital stock required to approve or adopt the proposal and/or (2) otherwise to solicit proxies or votes from stockholders in support of such proposal and (F) any other information relating to such item of business that would be required to be disclosed in a proxy statement or other filing required to be made in connection with solicitations of proxies in support of the business proposed to be brought before the meeting pursuant to Section 14(a) of the Exchange Act; *provided, however*, that the disclosures required by this paragraph (c)(iii) shall not include any disclosures with respect to the ordinary course business activities of any broker, dealer, commercial bank, trust company or other nominee who is a Proposing Person solely as a result of being the stockholder directed to prepare and submit the notice required by these bylaws on behalf of a beneficial owner.

(d) For purposes of this Section 2.4, the term "Proposing Person" shall mean (i) the stockholder providing the notice of business proposed to be brought before an annual meeting, (ii) the beneficial owner or beneficial owners, if different, on whose behalf the notice of the business proposed to be brought before the annual meeting is made, (iii) any affiliate or associate (each within the meaning of Rule 12b-2 under the Exchange Act for the purposes of these bylaws) of such stockholder or beneficial owner and (iv) any other person with whom such stockholder or beneficial owner (or any of their respective affiliates or associates) is Acting in Concert (as defined below).

(e) A person or entity shall be deemed to be "Acting in Concert" with another person or entity for purposes of these bylaws if such person or entity knowingly acts (whether or not pursuant to an express agreement, arrangement or understanding) in concert with, or towards a common goal relating to the management, governance or control of the Corporation in parallel with, such other person or entity where (i) each person or entity is conscious of the other person's or entity's conduct or intent and this awareness is an element in their decision-making processes and (ii) at least one additional factor suggests that such persons or entities intend to act in concert or in parallel, which such additional factors may include, without limitation, exchanging information (whether publicly or privately), attending meetings, conducting discussions, or making or soliciting invitations to act in concert or in parallel; ***provided***, that a person or entity shall not be deemed to be Acting in Concert with any other person or entity solely as a result of the solicitation or receipt of revocable proxies or consents from such other person or entity in response to a solicitation made pursuant to, and in accordance with, Section 14(a) of the Exchange Act by way of a proxy or consent solicitation statement filed on Schedule 14A. A person or entity Acting in Concert with another person or entity shall be deemed to be Acting in Concert with any third party who is also Acting in Concert with such other person or entity.

(f) A stockholder providing notice of business proposed to be brought before an annual meeting shall further update and supplement such notice, if necessary, so that the information provided or required to be provided in such notice pursuant to this Section 2.4 shall be true and correct as of the record date for determining stockholders entitled to notice of the annual meeting and as of the date that is ten (10) business days prior to the meeting or any adjournment or postponement thereof, and such update and supplement shall be delivered to, or mailed and received by, the secretary of the Corporation at the principal executive offices of the Corporation not later than five (5) business days after the record date for determining stockholders entitled to notice of the annual meeting (in the case of the update and supplement required to be made as of the record date), and not later than eight (8) business days prior to the date for the meeting or, if practicable, any adjournment or postponement thereof (and, if not practicable, on the first practicable date prior to the date to which the meeting has been adjourned or postponed) (in the case of the update and supplement required to be made as of ten (10) business days prior to the meeting or any adjournment or postponement thereof).

(g) Notwithstanding anything in these bylaws to the contrary and except as otherwise expressly provided in any applicable rule or regulation promulgated under the Exchange Act, no business shall be conducted at an annual meeting except in accordance with this Section 2.4. The presiding officer of an annual meeting of stockholders shall have the power and duty (i) to determine that any business was not properly brought before the meeting in accordance with this Section 2.4 (including whether the stockholder or beneficial owner, if any, on whose behalf the business proposed to be brought before the annual meeting is made, solicited (or is part of a group which solicited) or did not so solicit, as the case may be, proxies or votes in support of such stockholder's business in compliance with such stockholder's representation as required by clause (c)(iii)(E) of this Section 2.4); and (ii) if any proposed business was not proposed in compliance with this Section 2.4 to declare to the meeting that any such business not properly brought before the meeting shall not be transacted.

(h) The foregoing notice requirements of this Section 2.4 shall be deemed satisfied by a stockholder with respect to business other than a nomination if the stockholder has notified the Corporation of his, her or its intention to present a proposal at an annual meeting in compliance with applicable rules and regulations promulgated under the Exchange Act and such stockholder's proposal has been included in a proxy statement that has been prepared by the Corporation to solicit proxies for such annual meeting. Nothing in this Section 2.4 shall be deemed to affect the rights of stockholders to request inclusion of proposals in the Corporation's proxy statement pursuant to Rule 14a-8 under the Exchange Act.

(i) For purposes of these bylaws, "public disclosure" shall mean disclosure in a press release reported by a national news service or in a document publicly filed by the Corporation with the Securities and Exchange Commission pursuant to Sections 13, 14 or 15(d) of the Exchange Act.

(j) Notwithstanding the foregoing provisions of this Section 2.4, unless otherwise required by law, if the stockholder (or a qualified representative of the stockholder) does not appear at the annual meeting to present proposed business, such proposed business shall not be transacted, notwithstanding that proxies in respect of such vote may have been received by the Corporation. For purposes of this Section 2.4, except as provided under Rule 14a-8 under the Exchange Act, to be considered a qualified representative of the stockholder, a person must be a duly authorized officer, manager or partner of such stockholder or must be authorized by a writing executed by such stockholder or an electronic transmission delivered by such stockholder to act for such stockholder as proxy at the annual meeting prior to the making of such proposal, and such person must produce such writing or electronic transmission, or a reliable reproduction of the writing or electronic transmission, at the annual meeting.

(k) Notwithstanding the foregoing provisions of this Section 2.4, a stockholder shall also comply with all applicable requirements of the Exchange Act with respect to the matters set forth in this Section 2.4; provided however, that any references in these bylaws to the Exchange Act are not intended to and shall not limit any requirements applicable to proposals as to any business to be considered pursuant to this Section 2.4 (including, without limitation, paragraph (a)(iii) hereof), and compliance with paragraph (a)(iii) of this Section 2.4 shall be the exclusive means for a stockholder to submit business (other than, as provided in the first sentence of paragraph (h) of this Section 2.4, business brought properly under and in compliance with Rule 14a-8 of the Exchange Act, as may be amended from time to time).

2.5 ADVANCE NOTICE PROCEDURES FOR NOMINATIONS OF DIRECTORS.

(a) Nominations of any person for election to the Board at an annual meeting or at a special meeting (but, in the case of a special meeting, only if the election of directors is a matter specified in the notice of meeting given by or at the direction of the person or persons calling such special meeting) may be made at such meeting only (i) by or at the direction of the Board or any committee thereof, or (ii) by a stockholder who (A) was a stockholder of record of the Corporation (and, with respect to any beneficial owner, if different, on whose behalf such nomination is proposed to be made, only if such beneficial owner was the beneficial owner of shares of the Corporation) both at the time of giving the notice provided for in this Section 2.5 and at the time of the meeting, (B) is entitled to vote at the meeting and (C) has complied with this Section 2.5 as to such nomination. The foregoing clause (ii) shall be the exclusive means for a stockholder to make any nomination of a person or persons for election to the Board to be considered by the stockholders at an annual meeting or special meeting.

(b) Without qualification, for a stockholder to make any nomination of a person or persons for election to the Board at an annual meeting, the stockholder must (i) provide Timely Notice (as defined in Section 2.4(b) of these bylaws) thereof in writing and in proper form to the secretary of the Corporation and (ii) provide any updates or supplements to such notice at the times and in the forms required by this Section 2.5. Notwithstanding anything in this paragraph (b) to the contrary, in the event that the number of directors to be elected to the Board at an annual meeting is increased effective after the time period for which nominations would otherwise be due under this paragraph (b) and there is no public announcement by the Corporation naming the nominees for the additional directorships at least one hundred (100) days prior to the first anniversary of the preceding year's annual meeting, a stockholder's notice required by paragraph (b) of this Section 2.5 shall also be considered timely, but only with respect to nominees for the additional directorships, if it shall be delivered to the secretary at the principal executive offices of the Corporation not later than the close of business on the tenth (10th) day following the day on which such public announcement is first made by the Corporation. Without qualification, if the election of directors is a matter specified in the notice of meeting given by or at the direction of the person or persons calling such special meeting, then

for a stockholder to make any nomination of a person or persons for election to such position(s) as specified in the notice of the special meeting, the stockholder must (i) provide timely notice thereof in writing and in proper form to the secretary of the Corporation at the principal executive offices of the Corporation and (ii) provide any updates or supplements to such notice at the times and in the forms required by this Section 2.5. To be timely, a stockholder's notice for nominations to be made at a special meeting must be delivered to, or mailed and received at, the principal executive offices of the Corporation not earlier than the close of business on the one hundred twentieth (120th) day prior to such special meeting and not later than the later of (A) the close of business on the ninetieth (90th) day prior to such special meeting and (B) the close of business on the tenth (10th) day following the day on which public disclosure (as defined in Section 2.4(i) of these bylaws) of the date of such special meeting was first made. In no event shall any adjournment or postponement of an annual meeting or special meeting or the announcement thereof commence a new time period (or extend any time period) for the giving of a stockholder's notice as described above.

(c) To be in proper form for purposes of this Section 2.5, a stockholder's notice to the secretary of the Corporation shall set forth:

(i) As to each Nominating Person (as defined below), the Stockholder Information (as defined in Section 2.4(c)(i) of these bylaws) except that for purposes of this Section 2.5, the term "Nominating Person" shall be substituted for the term "Proposing Person" in all places it appears in Section 2.4(c)(i);

(ii) As to each Nominating Person, any Disclosable Interests (as defined in Section 2.4(c)(ii), except that for purposes of this Section 2.5 the term "Nominating Person" shall be substituted for the term "Proposing Person" in all places it appears in Section 2.4(c)(ii) and the disclosure in clause (L) of Section 2.4(c)(ii) shall be made with respect to the election of directors at the meeting) ***provided***, ***however***, that Disclosable Interests shall not include any such disclosures with respect to the ordinary course business activities of any broker, dealer, commercial bank, trust company or other nominee who is a Nominating Person solely as a result of being the stockholder directed to prepare and submit the notice required by these bylaws on behalf of a beneficial owner; and

(iii) As to each person whom a Nominating Person proposes to nominate for election as a director, (A) all information with respect to such proposed nominee that would be required to be set forth in a stockholder's notice pursuant to this Section 2.5 if such proposed nominee were a Nominating Person, (B) all information relating to such proposed nominee that is required to be disclosed in a proxy statement or other filings required to be made in connection with solicitations of proxies for election of directors in a contested election pursuant to Section 14(a) of the Exchange Act (including, without limitation, such proposed nominee's written consent to being named in the proxy statement as a nominee

and to serving as a director if elected), (C) a description of all direct and indirect compensation and other material monetary agreements, arrangements and understandings during the past three (3) years, and any other material relationships, between or among any Nominating Person, on the one hand, and each proposed nominee, his or her respective affiliates and associates and any other persons with whom such proposed nominee (or any of his or her respective affiliates and associates) is Acting in Concert (as defined in Section 2.4(e) of these bylaws), on the other hand, including, without limitation, all information that would be required to be disclosed pursuant to Item 404 under Regulation S-K if such Nominating Person were the "registrant" for purposes of such rule and the proposed nominee were a director or executive officer of such registrant (the disclosures to be made pursuant to the foregoing clauses (A) through (C) are referred to as "Nominee Information"), (D) a representation that the Nominating Person is a holder of record of stock of the Corporation entitled to vote at such meeting and intends to appear in person or by proxy at the meeting to propose such nomination, (E) a representation whether the Nominating Person intends or is part of a group which intends (1) to deliver a proxy statement and/or form of proxy to holders of at least the percentage of the Corporation's outstanding capital stock required to elect the nominee and/or (2) otherwise to solicit proxies or votes from stockholders in support of such nomination and (F) a completed and signed questionnaire, representation and agreement as provided in Section 2.5(g); and

(iv) The Corporation may require any proposed nominee to furnish such other information (A) as may reasonably be required by the Corporation to determine the eligibility of such proposed nominee to serve as an independent director of the Corporation in accordance with the Corporation's Corporate Governance Guidelines or (B) that could be material to a reasonable stockholder's understanding of the independence or lack of independence of such proposed nominee.

(d) For purposes of this Section 2.5, the term "Nominating Person" shall mean (i) the stockholder providing the notice of the nomination proposed to be made at the meeting, (ii) the beneficial owner or beneficial owners, if different, on whose behalf the notice of the nomination proposed to be made at the meeting is made, (iii) any affiliate or associate of such stockholder or beneficial owner and (iv) any other person or entity with whom such stockholder or such beneficial owner (or any of their respective affiliates or associates) is Acting in Concert.

(e) A stockholder providing notice of any nomination proposed to be made at a meeting shall further update and supplement such notice, if necessary, so that the information provided or required to be provided in such notice pursuant to this Section 2.5 shall be true and correct as of the record date for determining stockholders entitled to notice of the meeting and as of the date that is ten (10) business days prior to the meeting or any adjournment or postponement thereof, and such update and supplement shall be delivered to, or mailed and

received by, the secretary of the Corporation at the principal executive offices of the Corporation not later than five (5) business days after the record date for determining stockholders entitled to notice of the meeting (in the case of the update and supplement required to be made as of the record date), and not later than eight (8) business days prior to the date for the meeting or, if practicable, any adjournment or postponement thereof (and, if not practicable, on the first practicable date prior to the date to which the meeting has been adjourned or postponed) (in the case of the update and supplement required to be made as of ten (10) business days prior to the meeting or any adjournment or postponement thereof).

(f) Notwithstanding anything in these bylaws to the contrary, no person shall be eligible for election as a director of the Corporation unless nominated in accordance with this Section 2.5, except as otherwise expressly provided in any applicable rule or regulation promulgated under the Exchange Act. The presiding officer at any meeting of stockholders shall have the power and duty to (a) determine that a nomination was not properly made in accordance with this Section 2.5 (including whether the stockholder or beneficial owner, if any, on whose behalf the nomination was made, solicited or is part of a group which solicited) or did not so solicit, as the case may be, proxies or votes in support of such stockholder's nomination in compliance with such stockholder's representation as required by clause (c)(iii)(E) of this Section 2.5); and (b) if any proposed nomination was not made in compliance with this Section 2.5 to declare such determination to the meeting that the defective nomination shall be disregarded.

(g) To be eligible to be a nominee for election as a director of the Corporation, the proposed nominee must deliver (within the time periods prescribed for delivery of notice under this Section 2.5) to the secretary of the Corporation at the principal executive offices of the Corporation a written questionnaire with respect to the background and qualification of such proposed nominee (which questionnaire shall be provided by the secretary upon written request) and a written representation and agreement (in form provided by the secretary upon written request) that such proposed nominee (i) is not and will not become a party to (A) any agreement, arrangement or understanding with, and has not given any commitment or assurance to, any person or entity as to how such proposed nominee, if elected as a director of the Corporation, will act or vote on any issue or question (a "Voting Commitment") that has not been disclosed to the Corporation or (B) any Voting Commitment that could limit or interfere with such proposed nominee's ability to comply, if elected as a director of the Corporation, with such proposed nominee's fiduciary duties under applicable law, (ii) is not, and will not become a party to, any agreement, arrangement or understanding with any person or entity other than the Corporation with respect to any direct or indirect compensation, reimbursement or indemnification in connection with candidacy, service or action as a director, in each case, that has not been disclosed to the Corporation and (iii) in such proposed nominee's individual capacity and on behalf of the stockholder (and the beneficial owner, if different, on whose behalf the nomination is made) would be in compliance, if elected as a director of the Corporation, and will comply with applicable publicly disclosed corporate governance, conflict of interest, confidentiality and stock ownership and trading policies and guidelines of the Corporation.

(h) In addition to the requirements of this Section 2.5 with respect to any nomination proposed to be made at a meeting, each Nominating Person shall comply with all applicable requirements of the Exchange Act with respect to any such nominations.

(i) Notwithstanding the foregoing provisions of this Section 2.5, unless otherwise required by law, if the stockholder (or a qualified representative of the stockholder) does not appear at the meeting to present the proposed nomination, such proposed nomination shall not be considered, notwithstanding that proxies in respect of such vote may have been received by the Corporation. For purposes of this Section 2.5, to be considered a qualified representative of the stockholder, a person must be a duly authorized officer, manager or partner of such stockholder or must be authorized by a writing executed by such stockholder or an electronic transmission delivered by such stockholder to act for such stockholder as proxy at the meeting of stockholders prior to the making of such proposal, and such person must produce such writing or electronic transmission, or a reliable reproduction of the writing or electronic transmission, at the meeting.

2.6 NOTICE OF STOCKHOLDERS' MEETINGS.

Unless otherwise provided by law, the certificate of incorporation or these bylaws, the notice of any meeting of stockholders shall be given in accordance with either Section 2.7 or Section 8.1 of these bylaws not less than ten (10) nor more than sixty (60) days before the date of the meeting to each stockholder entitled to vote at such meeting as of the record date for determining the stockholders entitled to notice of the meeting. The notice shall specify the place, if any, date and hour of the meeting, the record date for determining the stockholders entitled to vote at the meeting (if such date is different from the record date for stockholders entitled to notice of the meeting), the means of remote communication, if any, by which stockholders and proxy holders may be deemed to be present in person and vote at such meeting, and, in the case of a special meeting, the purpose or purposes for which the meeting is called.

2.7 MANNER OF GIVING NOTICE; AFFIDAVIT OF NOTICE.

Notice of any meeting of stockholders shall be deemed given:

(a) if mailed, when deposited in the United States mail, postage prepaid, directed to the stockholder at such stockholder's address as it appears on the Corporation's records; or

(b) if electronically transmitted, as provided in Section 8.1 of these bylaws.

An affidavit of the secretary or an assistant secretary of the Corporation or of the transfer agent or any other agent of the Corporation that the notice has been given by mail or by a form of electronic transmission, as applicable, shall, in the absence of fraud, be prima facie evidence of the facts stated therein.

2.8 QUORUM.

Unless otherwise provided by law, the certificate of incorporation or these bylaws, the holders of a majority in voting power of the capital stock issued and outstanding and entitled to vote, present in person, or by remote communication, if applicable, or represented by proxy, shall constitute a quorum for the transaction of business at all meetings of the stockholders. A quorum, once established at a meeting, shall not be broken by the withdrawal of enough votes to leave less than a quorum. If, however, a quorum is not present or represented at any meeting of the stockholders, then either (a) the chairperson of the meeting or (b) a majority in voting power of the stockholders entitled to vote thereon, present in person, or by remote communication, if applicable, or represented by proxy, shall have power to adjourn the meeting from time to time in the manner provided in Section 2.9 of these bylaws until a quorum is present or represented. At such adjourned meeting at which a quorum is present or represented, any business may be transacted that might have been transacted at the meeting as originally noticed.

2.9 ADJOURNED MEETING; NOTICE.

When a meeting is adjourned to another time or place, unless these bylaws otherwise require, notice need not be given of the adjourned meeting if the time, place, if any, thereof, and the means of remote communications, if any, by which stockholders and proxy holders may be deemed to be present in person and vote at such adjourned meeting are announced at the meeting at which the adjournment is taken. At the adjourned meeting, the Corporation may transact any business which might have been transacted at the original meeting. If the adjournment is for more than thirty (30) days, or if after the adjournment a new record date for determining the stockholders entitled to vote is fixed for the adjourned meeting, a notice of the adjourned meeting shall be given to each stockholder of record entitled to vote at the adjourned meeting as of the record date for determining the stockholders entitled to notice of the adjourned meeting.

2.10 CONDUCT OF BUSINESS.

The date and time of the opening and the closing of the polls for each matter upon which the stockholders will vote at a meeting shall be announced at the meeting by the person presiding over the meeting. The Board may adopt by resolution such rules and regulations for the conduct of the meeting of stockholders as it shall deem appropriate. Except to the extent inconsistent with such rules and regulations as adopted by the Board, the person presiding over any meeting of stockholders shall have the right and authority to convene and (for any or no reason) to recess and/or adjourn the meeting, to prescribe such rules, regulations and procedures (which need not be in writing) and to do all such acts as, in the judgment of such presiding person, are appropriate for the proper conduct of the meeting. Such rules, regulations or procedures, whether adopted by the Board or prescribed by the presiding person of the meeting, may include, without limitation, the following: (a) the establishment of an agenda or order of business for the meeting; (b) rules and procedures for maintaining order at the meeting and the safety of those present (including, without limitation, rules and procedures for removal of disruptive persons from the meeting); (c)

limitations on attendance at or participation in the meeting to stockholders entitled to vote at the meeting, their duly authorized and constituted proxies or such other persons as the presiding person of the meeting shall determine; (d) restrictions on entry to the meeting after the time fixed for the commencement thereof; and (e) limitations on the time allotted to questions or comments by participants. The presiding person at any meeting of stockholders, in addition to making any other determinations that may be appropriate to the conduct of the meeting (including, without limitation, determinations with respect to the administration and/or interpretation of any of the rules, regulations or procedures of the meeting, whether adopted by the Board or prescribed by the person presiding over the meeting), shall, if the facts warrant, determine and declare to the meeting that a matter or business was not properly brought before the meeting and if such presiding person should so determine, such presiding person shall so declare to the meeting and any such matter or business not properly brought before the meeting shall not be transacted or considered. Unless and to the extent determined by the Board or the person presiding over the meeting, meetings of stockholders shall not be required to be held in accordance with the rules of parliamentary procedure.

2.11 VOTING.

The stockholders entitled to vote at any meeting of stockholders shall be determined in accordance with the provisions of Section 2.13 of these bylaws, subject to Section 217 (relating to voting rights of fiduciaries, pledgors and joint owners of stock) and Section 218 (relating to voting trusts and other voting agreements) of the DGCL.

Except as may be otherwise provided in the certificate of incorporation or these bylaws, each stockholder shall be entitled to one (1) vote for each share of capital stock held by such stockholder.

At all duly called or convened meetings of stockholders, at which a quorum is present, for the election of directors, a plurality of the votes cast shall be sufficient to elect a director. All other elections and questions presented to the stockholders at a duly called or convened meeting, at which a quorum is present, shall, unless a different or minimum vote is required by the certificate of incorporation, these bylaws, the rules or regulations of any stock exchange applicable to the Corporation, or any law or regulation applicable to the Corporation or its securities, in which case such different or minimum vote shall be the applicable vote on the matter, be decided by the affirmative vote of the holders of a majority in voting power of the votes cast affirmatively or negatively (excluding abstentions) at the meeting by the holders entitled to vote thereon.

2.12 STOCKHOLDER ACTION BY WRITTEN CONSENT WITHOUT A MEETING.

Any action required or permitted to be taken by the stockholders of the Corporation must be effected at a duly called annual or special meeting of stockholders of the Corporation and may not be effected by any consent in writing by such stockholders.

2.13 RECORD DATE FOR STOCKHOLDER NOTICE; VOTING.

In order that the Corporation may determine the stockholders entitled to notice of any meeting of stockholders or any adjournment thereof, the Board may fix a record date, which record date shall not precede the date upon which the resolution fixing the record date is adopted by the Board, and which record date shall, unless otherwise required by law, not be more than sixty (60) nor less than ten (10) days before the date of such meeting. If the Board so fixes a date, such date shall also be the record date for determining the stockholders entitled to vote at such meeting unless the Board determines, at the time it fixes such record date, that a later date on or before the date of the meeting shall be the date for making such determination. If no record date is fixed by the Board, the record date for determining stockholders entitled to notice of or to vote at a meeting of stockholders shall be at the close of business on the day next preceding the day on which notice is given, or, if notice is waived, at the close of business on the day next preceding the day on which the meeting is held. A determination of stockholders of record entitled to notice of or to vote at a meeting of stockholders shall apply to any adjournment of the meeting; *provided, however*, that the Board may fix a new record date for determination of stockholders entitled to vote at the adjourned meeting, and in such case shall also fix as the record date for stockholders entitled to notice of such adjourned meeting the same or an earlier date as that fixed for determination of stockholders entitled to vote in accordance herewith at the adjourned meeting.

In order that the Corporation may determine the stockholders entitled to receive payment of any dividend or other distribution or allotment of any rights, or entitled to exercise any rights in respect of any change, conversion or exchange of stock or for the purpose of any other lawful action, the Board may fix a record date, which shall not be more than sixty (60) days prior to such other action. If no such record date is fixed, the record date for determining stockholders for any such purpose shall be at the close of business on the day on which the Board adopts the resolution relating thereto.

2.14 PROXIES.

Each stockholder entitled to vote at a meeting of stockholders may authorize another person or persons to act for such stockholder by proxy, but no such proxy shall be voted or acted upon after three (3) years from its date, unless the proxy provides for a longer period. The revocability of a proxy that states on its face that it is irrevocable shall be governed by the provisions of Section 212 of the DGCL. A proxy may be in the form of a telegram, cablegram or other means of electronic transmission which sets forth or is submitted with information from which it can be determined that the telegram, cablegram or other means of electronic transmission was authorized by the stockholder.

2.15 LIST OF STOCKHOLDERS ENTITLED TO VOTE.

The Corporation shall prepare, at least ten (10) days before every meeting of stockholders, a complete list of the stockholders entitled to vote at the meeting (*provided, however*, if the record date for determining the stockholders entitled to vote is less than ten (10) days before the date of the meeting, the list shall reflect the stockholders entitled to vote as of the tenth day before the date of the meeting), arranged in alphabetical order, and showing the address of each stockholder and the number of shares registered in the name of each stockholder. The Corporation shall not be required to include electronic mail addresses or other electronic contact information on such list. Such list shall be open to the examination of any stockholder, for any purpose germane to the meeting for a period of at least ten (10) days prior to the meeting: (a) on a reasonably accessible electronic network, provided that the information required to gain access to such list is provided with the notice of the meeting, or (b) during ordinary business hours, at the Corporation's principal executive office. In the event that the Corporation determines to make the list available on an electronic network, the Corporation may take reasonable steps to ensure that such information is available only to stockholders of the Corporation. If the meeting is to be held at a place, then the list shall be produced and kept at the time and place of the meeting during the whole time thereof, and may be inspected by any stockholder who is present. If the meeting is to be held solely by means of remote communication, then the list shall also be open to the examination of any stockholder during the whole time of the meeting on a reasonably accessible electronic network, and the information required to access such list shall be provided with the notice of the meeting. Except as otherwise provided by law, the stock ledger shall be the only evidence as to the identity of the stockholders entitled to vote in person or by proxy and the number of shares held by each of them, and as to the stockholders entitled to examine the list of stockholders.

2.16 POSTPONEMENT, ADJOURNMENT AND CANCELLATION OF MEETING.

Any previously scheduled annual or special meeting of the stockholders may be postponed or adjourned, and any previously scheduled annual or special meeting of the stockholders may be canceled, by resolution of the Board.

2.17 INSPECTORS OF ELECTION.

Before any meeting of stockholders, the Board shall appoint an inspector or inspectors of election to act at the meeting or its adjournment or postponement and make a written report thereof. The number of inspectors shall be either one (1) or three (3). If any person appointed as inspector fails to appear or fails or refuses to act, then the chairperson of the meeting may, and upon the request of any stockholder or a stockholder's proxy shall, appoint a person to fill that

vacancy. Unless otherwise required by law, inspectors may be officers, employees or agents of the Corporation. Such inspectors shall have the duties prescribed by law. Each inspector, before entering upon the discharge of his or her duties, shall take and sign an oath to execute faithfully the duties of inspector with strict impartiality and according to the best of his or her ability. If there are three (3) inspectors of election, the decision, act or certificate of a majority is effective in all respects as the decision, act or certificate of all. Any report or certificate made by the inspectors of election is prima facie evidence of the facts stated therein.

ARTICLE III - DIRECTORS

3.1 POWERS.

Subject to the provisions of the DGCL and any limitations in the certificate of incorporation, the business and affairs of the Corporation shall be managed and all corporate powers shall be exercised by or under the direction of the Board.

3.2 NUMBER OF DIRECTORS.

The authorized number of directors shall be determined from time to time by resolution of the Board, provided the Board shall consist of at least one (1) member. No reduction of the authorized number of directors shall have the effect of removing any director before that director's term of office expires.

3.3 ELECTION, QUALIFICATION AND TERM OF OFFICE OF DIRECTORS.

Except as provided in Section 3.4 of these bylaws, each director, including, without limitation, a director elected to fill a vacancy, shall hold office until the expiration of the term for which elected and until such director's successor is elected and qualified or until such director's earlier death, resignation or removal. Directors need not be stockholders unless so required by the certificate of incorporation or these bylaws. The Corporation may also have, at the discretion of the Board, a chairperson of the Board and a vice chairperson of the Board. The certificate of incorporation or these bylaws may prescribe other qualifications for directors.

3.4 RESIGNATION AND VACANCIES.

Any director may resign at any time upon notice given in writing or by electronic transmission to the chairperson of the Board or the Corporation's chief executive officer, president or secretary. When one or more directors so resigns and the resignation is effective at a future date, a majority of the directors then in office, including those who have so resigned, shall have power to fill such vacancy or vacancies, the vote thereon to take effect when such resignation or resignations shall become effective, and each director so chosen shall hold office as provided in this section in the filling of other vacancies.

Unless otherwise provided in the certificate of incorporation or these bylaws, vacancies and newly created directorships resulting from any increase in the authorized number of directors shall, unless the Board determines by resolution that any such vacancies or newly created directorships shall be filled by stockholders, be filled only by a majority of the directors then in office, although less than a quorum, or by a sole remaining director. Any director elected in accordance with the preceding sentence shall hold office for the remainder of the full term of the director for which the vacancy was created or occurred and until such director's successor shall have been elected and qualified. A vacancy in the Board shall be deemed to exist under these bylaws in the case of the death, removal or resignation of any director.

3.5 PLACE OF MEETINGS; MEETINGS BY TELEPHONE.

The Board may hold meetings, both regular and special, either within or outside the State of Delaware.

Unless otherwise restricted by the certificate of incorporation or these bylaws, members of the Board, or any committee designated by the Board, may participate in a meeting of the Board, or any committee, by means of conference telephone or other communications equipment by means of which all persons participating in the meeting can hear each other, and such participation in a meeting pursuant to this bylaw shall constitute presence in person at the meeting.

3.6 REGULAR MEETINGS.

Regular meetings of the Board may be held without notice at such time and at such place as shall from time to time be determined by the Board; *provided* that any director who is absent when such determination is made shall be given notice of the determination. A regular meeting of the Board may be held without notice immediately after and at the same place as the annual meeting of stockholders.

3.7 SPECIAL MEETINGS; NOTICE.

Special meetings of the Board for any purpose or purposes may be called at any time by the chairperson of the Board, the chief executive officer, the president, the secretary or a majority of the authorized number of directors.

Notice of the time and place of special meetings shall be:

(a) delivered personally by hand, by courier or by telephone;

(b) sent by United States first-class mail, postage prepaid;

(c) sent by facsimile; or

(d) sent by electronic mail, electronic transmission or other similar means,

directed to each director at that director's address, telephone number, facsimile number or electronic mail or other electronic address, as the case may be, as shown on the Corporation's records.

If the notice is (a) delivered personally by hand, by courier or by telephone, (b) sent by facsimile or (c) sent by electronic mail or electronic transmission, it shall be delivered or sent at least twenty-four (24) hours before the time of the holding of the meeting. If the notice is sent by United States mail, it shall be deposited in the United States mail at least four (4) days before the time of the holding of the meeting. Any oral notice may be communicated to the director. The notice need not specify the place of the meeting (if the meeting is to be held at the Corporation's principal executive office) nor the purpose of the meeting; provided, however, that notice of any meeting need not be given to any director if waived by him or her in writing, or if he or she shall be present at such meeting other than for purposes of objecting to the validity of the meeting.

3.8 QUORUM.

The greater of (a) a majority of the directors at any time in office and (b) one-third of the number of directors established by the Board pursuant to Section 3.2 of these bylaws shall constitute a quorum of the Board for the transaction of business. The vote of a majority of the directors present at any meeting at which a quorum is present shall be the act of the Board, except as may be otherwise specifically provided by statute, the certificate of incorporation or these bylaws. If a quorum is not present at any meeting of the Board, then the directors present thereat may adjourn the meeting from time to time, without notice other than announcement at the meeting, until a quorum is present.

3.9 BOARD ACTION BY CONSENT WITHOUT A MEETING.

Unless otherwise restricted by the certificate of incorporation or these bylaws, any action required or permitted to be taken at any meeting of the Board, or of any committee thereof, may be taken without a meeting if all members of the Board or committee, as the case may be, consent thereto in writing or by electronic transmission and the writing or writings or electronic transmission or transmissions are filed with the minutes of proceedings of the Board or committee. Such filing shall be in paper form if the minutes are maintained in paper form and shall be in electronic form if the minutes are maintained in electronic form.

3.10 FEES AND COMPENSATION OF DIRECTORS.

Unless otherwise restricted by the certificate of incorporation or these bylaws, the Board shall have the authority to fix the compensation of directors.

3.11 REMOVAL OF DIRECTORS.

Subject to the rights of the holders of the shares of any series of Preferred Stock, the Board or any individual director may be removed from office only for cause and only by the affirmative vote of the holders of at least two-thirds in voting power of the outstanding shares of capital stock of the Corporation entitled to vote thereon.

ARTICLE IV - COMMITTEES

4.1 COMMITTEES OF DIRECTORS.

The Board may designate one (1) or more committees, each committee to consist of one (1) or more of the directors of the Corporation. The Board may designate one (1) or more directors as alternate members of any committee, who may replace any absent or disqualified member at any meeting of the committee. In the absence or disqualification of a member of a committee, the member or members thereof present at any meeting and not disqualified from voting, whether or not such member or members constitute a quorum, may unanimously appoint another member of the Board to act at the meeting in the place of any such absent or disqualified member. Any such committee, to the extent provided in the resolution of the Board or in these bylaws, shall have and may exercise all the powers and authority of the Board in the management of the business and affairs of the Corporation, and may authorize the seal of the Corporation to be affixed to all papers that may require it; but no such committee shall have the power or authority to (a) approve or adopt, or recommend to the stockholders, any action or matter (other than the election or removal of directors) expressly required by the DGCL to be submitted to stockholders for approval, or (b) adopt, amend or repeal any bylaw of the Corporation.

4.2 COMMITTEE MINUTES.

Each committee shall keep regular minutes of its meetings and report the same to the Board when required.

4.3 MEETINGS AND ACTION OF COMMITTEES.

Meetings and actions of committees shall be governed by, and held and taken in accordance with, the provisions of:

(a) Section 3.5 of these bylaws (place of meetings and meetings by telephone);

(b) Section 3.6 of these bylaws (regular meetings);

(c) Section 3.7 of these bylaws (special meetings and notice);

(d) Section 3.8 of these bylaws (quorum);

(e) Section 7.12 of these bylaws (waiver of notice); and

(f) Section 3.9 of these bylaws (action without a meeting),

with such changes in the context of those bylaws as are necessary to substitute the committee and its members for the Board and its members. *However*:

(i) the time of regular meetings of committees may be determined either by resolution of the Board or by resolution of the committee;

(ii) special meetings of committees may also be called by resolution of the Board; and

(iii) notice of special meetings of committees shall also be given to all alternate members, who shall have the right to attend all meetings of the committee. The Board may adopt rules for the governance of any committee not inconsistent with the provisions (or any part thereof) of these bylaws.

ARTICLE V - OFFICERS

5.1 OFFICERS.

The officers of the Corporation shall be a president and a secretary. The Corporation may also have, at the discretion of the Board, a chief executive officer, a chief financial officer or treasurer, one (1) or more vice presidents, one (1) or more assistant vice presidents, one (1) or more assistant treasurers, one (1) or more assistant secretaries, and any such other officers as may be appointed in accordance with the provisions of these bylaws. Any number of offices may be held by the same person.

5.2 APPOINTMENT OF OFFICERS.

The Board shall appoint the officers of the Corporation, except such officers as may be appointed in accordance with the provisions of Section 5.3 of these bylaws, subject to the rights, if any, of an officer under any contract of employment.

5.3 SUBORDINATE OFFICERS.

The Board may appoint, or empower the chief executive officer or, in the absence of a chief executive officer, the president, to appoint, such other officers and agents as the business of the Corporation may require. Each of such officers and agents shall hold office for such period, have such authority and perform such duties as are provided in these bylaws or as the Board may from time to time determine.

5.4 REMOVAL AND RESIGNATION OF OFFICERS.

Subject to the rights, if any, of an officer under any contract of employment, any officer may be removed, either with or without cause, by the Board at any regular or special meeting of the Board or, except in the case of an officer chosen by the Board, by any officer upon whom such power of removal may be conferred by the Board.

Any officer may resign at any time by giving written notice to the Corporation. Any resignation shall take effect at the date of the receipt of that notice or at any later time specified in that notice. Unless otherwise specified in the notice of resignation, the acceptance of the resignation shall not be necessary to make it effective. Any resignation is without prejudice to the rights, if any, of the Corporation under any contract to which the officer is a party.

5.5 VACANCIES IN OFFICES.

Any vacancy occurring in any office of the Corporation shall be filled by the Board or as provided in Section 5.3 of these bylaws.

5.6 REPRESENTATION OF SHARES OF OTHER ENTITIES.

The chairperson of the Board, the president, any vice president, the treasurer, the secretary or assistant secretary of this Corporation, or any other person authorized by the Board or the president or a vice president, is authorized to vote, represent and exercise on behalf of this Corporation all rights incident to any and all securities of any other entity or entities standing in the name of this Corporation. The authority granted herein may be exercised either by such person directly or by any other person authorized to do so by proxy or power of attorney duly executed by such person having the authority.

5.7 AUTHORITY AND DUTIES OF OFFICERS.

All officers of the Corporation shall respectively have such authority and perform such duties in the management of the business of the Corporation as may be designated from time to time by the Board and, to the extent not so provided, as generally pertain to their respective offices, subject to the control of the Board.

ARTICLE VI - RECORDS AND REPORTS

6.1 MAINTENANCE OF RECORDS.

Subject to applicable law, the Corporation shall, either at its principal executive office or at such place or places as designated by the Board, keep a record of its stockholders listing their names and addresses and the number and class of shares held by each stockholder, a copy of these bylaws as amended to date, accounting books and other records.

ARTICLE VII - GENERAL MATTERS

7.1 EXECUTION OF CORPORATE CONTRACTS AND INSTRUMENTS.

The Board, except as otherwise provided in these bylaws, may authorize any officer or officers, or agent or agents, to enter into any contract or execute any instrument in the name of and on behalf of the Corporation; such authority may be general or confined to specific instances. Unless so authorized or ratified by the Board or within the agency power of an officer, no officer, agent or employee shall have any power or authority to bind the Corporation by any contract or engagement or to pledge its credit or to render it liable for any purpose or for any amount.

7.2 STOCK CERTIFICATES; PARTLY PAID SHARES.

The shares of the Corporation shall be represented by certificates provided that the Board may provide by resolution or resolutions that some or all of any or all classes or series of stock shall be uncertificated shares. Certificates for the shares of stock, if any, shall be in such form as is consistent with the certificate of incorporation and applicable law. Every holder of stock represented by a certificate shall be entitled to have a certificate signed by, or in the name of the Corporation by any two authorized officers of the Corporation representing the number of shares registered in certificate form. Any or all of the signatures on the certificate may be a facsimile. In case any officer, transfer agent or registrar who has signed or whose facsimile signature has been placed upon a certificate has ceased to be such officer, transfer agent or registrar before such certificate is issued, it may be issued by the Corporation with the same effect as if he were such officer, transfer agent or registrar at the date of issue.

The Corporation may issue the whole or any part of its shares as partly paid and subject to call for the remainder of the consideration to be paid therefor. Upon the face or back of each stock certificate issued to represent any such partly paid shares, or upon the books and records of the Corporation in the case of uncertificated partly paid shares, the total amount of the consideration to be paid therefor and the amount paid thereon shall be stated. Upon the declaration of any dividend on fully paid shares, the Corporation shall declare a dividend upon partly paid shares of the same class, but only upon the basis of the percentage of the consideration actually paid thereon.

7.3 MULTIPLES CLASSES OR SERIES OF STOCK.

If the Corporation is authorized to issue more than one class of stock or more than one series of any class, then the powers, the designations, the preferences and the relative, participating, optional or other special rights of each class of stock or series thereof and the qualifications, limitations or restrictions of such preferences and/or rights shall be set forth in full or summarized on the face or back of the certificate that the Corporation shall issue to represent such class or series of stock; *provided*, *however*, that, except as otherwise provided in Section 202 of the DGCL, in lieu of the foregoing requirements, there may be set forth on the face or back of the certificate that the Corporation shall issue to represent such class or series of stock a statement that the Corporation will furnish without charge to each stockholder who so requests the powers, the designations, the preferences and the relative, participating, optional or other special rights of each class of stock or series thereof and the qualifications, limitations or restrictions of such preferences and/or rights. Within a reasonable time after the issuance or transfer or uncertificated stock, the Corporation shall send to the registered owner thereof a written notice containing the information required to be set forth or stated on certificates pursuant to the DGCL or a statement that the Corporation will furnish without charge to each stockholder who so requests the powers, designations, preferences and relative participating, optional or other special rights of each class of stock or series thereof and the qualifications, limitations or restrictions of such preferences and/or rights.

7.4 LOST CERTIFICATES.

Except as provided in this Section 7.4, no new certificates for shares shall be issued to replace a previously issued certificate unless the latter is surrendered to the Corporation in accordance with applicable law. The Corporation may issue a new certificate of stock or uncertificated shares in the place of any certificate theretofore issued by it, alleged to have been lost, stolen or destroyed, and the Corporation may require the owner of the lost, stolen or destroyed certificate, or such owner's legal representative, to give the Corporation a bond sufficient to indemnify it against any claim that may be made against it on account of the alleged loss, theft or destruction of any such certificate or the issuance of such new certificate or uncertificated shares.

7.5 CONSTRUCTION; DEFINITIONS.

Unless the context requires otherwise, the general provisions, rules of construction and definitions in the DGCL shall govern the construction of these bylaws. Without limiting the generality of this provision, the singular number includes the plural, the plural number includes the singular, and the term "person" includes both a corporation and a natural person.

7.6 DIVIDENDS.

The Board, subject to any restrictions contained in either (a) the DGCL or (b) the certificate of incorporation, may declare and pay dividends upon the shares of its capital stock. Dividends may be paid in cash, in property or in shares of the Corporation's capital stock.

The Board may set apart out of any of the funds of the Corporation available for dividends a reserve or reserves for any proper purpose and may abolish any such reserve. Such purposes shall include but not be limited to equalizing dividends, repairing or maintaining any property of the Corporation, and meeting contingencies.

7.7 FISCAL YEAR.

The fiscal year of the Corporation shall be fixed by resolution of the Board and may be changed by the Board.

7.8 SEAL.

The Corporation may adopt a corporate seal, which shall be adopted and which may be altered by the Board. The Corporation may use the corporate seal by causing it or a facsimile thereof to be impressed or affixed or in any other manner reproduced.

7.9 TRANSFER OF STOCK.

Shares of the Corporation shall be transferable in the manner prescribed by law and in these bylaws. Shares of stock of the Corporation shall be transferred on the books of the Corporation only by the holder of record thereof or by such holder's attorney duly authorized in writing, upon surrender to the Corporation of the certificate or certificates representing such shares endorsed by the appropriate person or persons (or by delivery of duly executed instructions with respect to uncertificated shares), with such evidence of the authenticity of such endorsement or execution, transfer, authorization and other matters as the Corporation may reasonably require, and accompanied by all necessary stock transfer stamps. To the fullest extent permitted by law, no transfer of stock shall be valid as against the Corporation for any purpose until it shall have been entered in the stock records of the Corporation by an entry showing the names of the persons from and to whom it was transferred.

7.10 STOCK TRANSFER AGREEMENTS.

The Corporation shall have power to enter into and perform any agreement with any number of stockholders of any one or more classes of stock of the Corporation to restrict the transfer of shares of stock of the Corporation of any one or more classes owned by such stockholders in any manner not prohibited by the DGCL.

7.11 REGISTERED STOCKHOLDERS.

The Corporation, to the fullest extent permitted by law:

(a) shall be entitled to recognize the exclusive right of a person registered on its books as the owner of shares to receive dividends and to vote as such owner;

(b) shall be entitled to hold liable for calls and assessments the person registered on its books as the owner of shares; and

(c) shall not be bound to recognize any equitable or other claim to or interest in such share or shares on the part of another person, whether or not it shall have express or other notice thereof, except as otherwise provided by the laws of Delaware.

7.12 WAIVER OF NOTICE.

Whenever notice is required to be given under any provision of the DGCL, the certificate of incorporation or these bylaws, a written waiver, signed by the person entitled to notice, or a waiver by electronic transmission by the person entitled to notice, whether before or after the time of the event for which notice is to be given, shall be deemed equivalent to notice. Attendance of a person at a meeting shall constitute a waiver of notice of such meeting, except when the person attends a meeting for the express purpose of objecting at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened. Neither the business to be transacted at, nor the purpose of, any regular or special meeting of the stockholders need be specified in any written waiver of notice or any waiver by electronic transmission unless so required by the certificate of incorporation or these bylaws.

ARTICLE VIII - NOTICE BY ELECTRONIC TRANSMISSION

8.1 NOTICE BY ELECTRONIC TRANSMISSION.

Without limiting the manner by which notice otherwise may be given effectively to stockholders pursuant to the DGCL, the certificate of incorporation or these bylaws, any notice to stockholders given by the Corporation under any provision of the DGCL, the certificate of incorporation or these bylaws shall be effective if given by a form of electronic transmission consented to by the stockholder to whom the notice is given. Any such consent shall be revocable by the stockholder by written notice to the Corporation. Any such consent shall be deemed revoked if:

(a) the Corporation is unable to deliver by electronic transmission two (2) consecutive notices given by the Corporation in accordance with such consent; and

(b) such inability becomes known to the secretary or an assistant secretary of the Corporation or to the transfer agent, or other person responsible for the giving of notice.

However, the inadvertent failure to treat such inability as a revocation shall not invalidate any meeting or other action.

Any notice given pursuant to the preceding paragraph shall be deemed given:

(a) if by facsimile telecommunication, when directed to a number at which the stockholder has consented to receive notice;

(b) if by electronic mail, when directed to an electronic mail address at which the stockholder has consented to receive notice;

(c) if by a posting on an electronic network together with separate notice to the stockholder of such specific posting, upon the later of (i) such posting and (ii) the giving of such separate notice; and

(d) if by any other form of electronic transmission, when directed to the stockholder.

An affidavit of the secretary or an assistant secretary of the Corporation or of the transfer agent or other agent of the Corporation that the notice has been given by a form of electronic transmission shall, in the absence of fraud, be prima facie evidence of the facts stated therein.

8.2 DEFINITION OF ELECTRONIC TRANSMISSION.

For the purposes of these bylaws, an "electronic transmission" means any form of communication, not directly involving the physical transmission of paper, that creates a record that may be retained, retrieved and reviewed by a recipient thereof, and that may be directly reproduced in paper form by such a recipient through an automated process.

ARTICLE IX - INDEMNIFICATION AND ADVANCEMENT

9.1 ACTIONS, SUITS AND PROCEEDINGS OTHER THAN BY OR IN THE RIGHT OF THE CORPORATION.

The Corporation shall indemnify each person who was or is a party or threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of the Corporation) by reason of the fact that he or she is or was, or has agreed to become, a director or officer of the Corporation, or, while a director or officer of the Corporation, is or was serving, or has agreed to serve, at the request of the Corporation, as a director, officer, partner, employee or trustee of, or in a similar capacity with, another corporation, partnership, joint venture, trust or other enterprise (including, without limitation, any employee benefit plan) (all such persons being referred to hereafter as an "Indemnitee"), or by reason of any action alleged to have been taken or omitted in such capacity, against all expenses (including, without limitation, attorneys' fees), liabilities, losses, judgments, fines (including, without limitation, excise taxes and penalties arising under the Employee Retirement Income Security Act of 1974), and amounts paid in settlement actually and reasonably incurred by or on behalf of Indemnitee in connection with such action, suit or proceeding and any appeal therefrom, if Indemnitee acted in good faith

and in a manner which Indemnitee reasonably believed to be in, or not opposed to, the best interests of the Corporation, and, with respect to any criminal action or proceeding, had no reasonable cause to believe his or her conduct was unlawful. The termination of any action, suit or proceeding by judgment, order, settlement, conviction or upon a plea of nolo contendere or its equivalent, shall not, of itself, create a presumption that Indemnitee did not act in good faith and in a manner which Indemnitee reasonably believed to be in, or not opposed to, the best interests of the Corporation, and, with respect to any criminal action or proceeding, had reasonable cause to believe that his or her conduct was unlawful.

9.2 ACTIONS OR SUITS BY OR IN THE RIGHT OF THE CORPORATION.

The Corporation shall indemnify any Indemnitee who was or is a party to or threatened to be made a party to any threatened, pending or completed action or suit by or in the right of the Corporation to procure a judgment in its favor by reason of the fact that Indemnitee is or was, or has agreed to become, a director or officer of the Corporation, or, while a director or officer of the Corporation, is or was serving, or has agreed to serve, at the request of the Corporation, as a director, officer, partner, employee or trustee of, or in a similar capacity with, another corporation, partnership, joint venture, trust or other enterprise (including, without limitation, any employee benefit plan), or by reason of any action alleged to have been taken or omitted in such capacity, against all expenses (including, without limitation, attorneys' fees) actually and reasonably incurred by or on behalf of Indemnitee in connection with such action, suit or proceeding and any appeal therefrom, if Indemnitee acted in good faith and in a manner which Indemnitee reasonably believed to be in, or not opposed to, the best interests of the Corporation, except that no indemnification shall be made under this Section 9.2 in respect of any claim, issue or matter as to which Indemnitee shall have been adjudged to be liable to the Corporation, unless, and only to the extent, that the Court of Chancery of Delaware or the court in which such action or suit was brought shall determine upon application that, despite the adjudication of such liability but in view of all the circumstances of the case, Indemnitee is fairly and reasonably entitled to indemnity for such expenses (including, without limitation, attorneys' fees) which the Court of Chancery of Delaware or such other court shall deem proper.

9.3 INDEMNIFICATION FOR EXPENSES OF SUCCESSFUL PARTY.

Notwithstanding any other provisions of this Article IX, to the extent that an Indemnitee has been successful, on the merits or otherwise, in defense of any action, suit or proceeding referred to in Sections 9.1 and 9.2 of these bylaws, or in defense of any claim, issue or matter therein, or on appeal from any such action, suit or proceeding, Indemnitee shall be indemnified to the fullest extent permitted by law against all expenses (including, without limitation, attorneys' fees) actually and reasonably incurred by or on behalf of Indemnitee in connection therewith.

9.4 NOTIFICATION AND DEFENSE OF CLAIM.

As a condition precedent to an Indemnitee's right to be indemnified, such Indemnitee must notify the Corporation in writing as soon as practicable of any action, suit, proceeding or investigation involving such Indemnitee for which indemnity will or could be sought. With respect to any action, suit, proceeding or investigation of which the Corporation is so notified, the Corporation will be entitled to participate therein at its own expense and/or to assume the defense thereof at its own expense, with legal counsel reasonably acceptable to Indemnitee. After notice from the Corporation to Indemnitee of its election so to assume such defense, the Corporation shall not be liable to Indemnitee for any legal or other expenses subsequently incurred by Indemnitee in connection with such action, suit, proceeding or investigation, other than as provided below in this Section 9.4. Indemnitee shall have the right to employ his or her own counsel in connection with such action, suit, proceeding or investigation, but the fees and expenses of such counsel incurred after notice from the Corporation of its assumption of the defense thereof shall be at the expense of Indemnitee unless (a) the employment of counsel by Indemnitee has been authorized by the Corporation, (b) counsel to Indemnitee shall have reasonably concluded that there may be a conflict of interest or position on any significant issue between the Corporation and Indemnitee in the conduct of the defense of such action, suit, proceeding or investigation or (c) the Corporation shall not in fact have employed counsel to assume the defense of such action, suit, proceeding or investigation, in each of which cases the fees and expenses of counsel for Indemnitee shall be at the expense of the Corporation, except as otherwise expressly provided by this Article IX. The Corporation shall not be entitled, without the consent of Indemnitee, to assume the defense of any claim brought by or in the right of the Corporation or as to which counsel for Indemnitee shall have reasonably made the conclusion provided for in clause (b) above. The Corporation shall not be required to indemnify Indemnitee under this Article IX for any amounts paid in settlement of any action, suit, proceeding or investigation effected without its written consent. The Corporation shall not settle any action, suit, proceeding or investigation in any manner which would impose any penalty or limitation on Indemnitee without Indemnitee's written consent. Neither the Corporation nor Indemnitee will unreasonably withhold or delay its consent to any proposed settlement.

9.5 ADVANCE OF EXPENSES.

Subject to the provisions of Sections 9.4 and 9.6 of these bylaws, in the event of any threatened or pending action, suit, proceeding or investigation of which the Corporation receives notice under this Article IX, any expenses (including, without limitation, attorneys' fees) incurred by or on behalf of Indemnitee in defending an action, suit, proceeding or investigation or any appeal therefrom shall be paid by the Corporation in advance of the final disposition of such matter to the fullest extent permitted by law; *provided, however*, that, to the extent required by law, the payment of such expenses incurred by or on behalf of Indemnitee in advance of the final disposition of such matter shall be made only upon receipt of an undertaking by or on behalf of Indemnitee to repay all amounts so advanced in the event that it shall ultimately be

determined by final judicial decision from which there is no further right to appeal that Indemnitee is not entitled to be indemnified by the Corporation as authorized in this Article IX or otherwise; and *provided further* that no such advancement of expenses shall be made under this Article IX if it is determined (in the manner described in Section 9.6 of these bylaws) that (a) Indemnitee did not act in good faith and in a manner he or she reasonably believed to be in, or not opposed to, the best interests of the Corporation, or (b) with respect to any criminal action or proceeding, Indemnitee had reasonable cause to believe his or her conduct was unlawful. Such undertaking shall be accepted without reference to the financial ability of Indemnitee to make such repayment.

9.6 PROCEDURE FOR INDEMNIFICATION AND ADVANCEMENT OF EXPENSES.

In order to obtain indemnification or advancement of expenses pursuant to Section 9.1, 9.2, 9.3 or 9.5 of these bylaws, an Indemnitee shall submit to the Corporation a written request. Any such advancement of expenses shall be made promptly, and in any event within 60 days after receipt by the Corporation of the written request of Indemnitee, unless (a) the Corporation has assumed the defense pursuant to Section 9.4 of these bylaws (and none of the circumstances described in Section 9.4 of these bylaws that would nonetheless entitle the Indemnitee to indemnification for the fees and expenses of separate counsel have occurred) or (b) the Corporation determines within such 60-day period that Indemnitee did not meet the applicable standard of conduct set forth in Section 9.1, 9.2 or 9.5 of these bylaws, as the case may be. Any such indemnification, unless ordered by a court, shall be made with respect to requests under Section 9.1 or 9.2 of these bylaws only as authorized in the specific case upon a determination by the Corporation that the indemnification of Indemnitee is proper because Indemnitee has met the applicable standard of conduct set forth in Section 9.1 or 9.2 of these bylaws, as the case may be. Such determination shall be made in each instance (a) by a majority vote of the directors of the Corporation consisting of persons who are not at that time parties to the action, suit or proceeding in question ("disinterested directors"), whether or not a quorum, (b) by a committee of disinterested directors designated by majority vote of disinterested directors, whether or not a quorum, (c) if there are no disinterested directors, or if the disinterested directors so direct, by independent legal counsel (who may, to the extent permitted by law, be regular legal counsel to the Corporation) in a written opinion or (d) by the stockholders of the Corporation.

9.7 REMEDIES.

To the fullest extent permitted by law, the right to indemnification or advancement of expenses as granted by this Article IX shall be enforceable by Indemnitee in any court of competent jurisdiction. Neither the failure of the Corporation to have made a determination prior to the commencement of such action that indemnification is proper in the circumstances because Indemnitee has met the applicable standard of conduct, nor an actual determination by the Corporation pursuant to Section 9.6 of these bylaws that Indemnitee has not met such applicable

standard of conduct, shall be a defense to the action or create a presumption that Indemnitee has not met the applicable standard of conduct. In any suit brought by Indemnitee to enforce a right to indemnification or advancement, or brought by the Corporation to recover an advancement of expenses pursuant to the terms of an undertaking, the Corporation shall have the burden of proving that Indemnitee is not entitled to be indemnified, or to such advancement of expenses, under this Article IX. Indemnitee's expenses (including, without limitation, attorneys' fees) reasonably incurred in connection with successfully establishing Indemnitee's right to indemnification or advancement, in whole or in part, in any such proceeding shall also be indemnified by the Corporation to the fullest extent permitted by law. Notwithstanding the foregoing, in any suit brought by Indemnitee to enforce a right to indemnification hereunder it shall be a defense that the Indemnitee has not met any applicable standard for indemnification set forth in the DGCL.

9.8 LIMITATIONS.

Notwithstanding anything to the contrary in this Article IX, except as set forth in Section 9.7 of these bylaws, the Corporation shall not indemnify an Indemnitee pursuant to this Article IX in connection with a proceeding (or part thereof) initiated by such Indemnitee unless the initiation thereof was approved by the Board. Notwithstanding anything to the contrary in this Article IX, the Corporation shall not indemnify (or advance expenses to) an Indemnitee to the extent such Indemnitee is reimbursed (or advanced expenses) from the proceeds of insurance, and in the event the Corporation makes any indemnification (or advancement) payments to an Indemnitee and such Indemnitee is subsequently reimbursed from the proceeds of insurance, such Indemnitee shall promptly refund indemnification (or advancement) payments to the Corporation to the extent of such insurance reimbursement.

9.9 SUBSEQUENT AMENDMENT.

No amendment, termination or repeal of this Article IX or of the relevant provisions of the DGCL or any other applicable laws shall adversely affect or diminish in any way the rights of any Indemnitee to indemnification or advancement of expenses under the provisions hereof with respect to any action, suit, proceeding or investigation arising out of or relating to any actions, transactions or facts occurring prior to the final adoption of such amendment, termination or repeal.

9.10 OTHER RIGHTS.

The indemnification and advancement of expenses provided by this Article IX shall not be deemed exclusive of any other rights to which an Indemnitee seeking indemnification or advancement of expenses may be entitled under any law (common or statutory), agreement or vote of stockholders or disinterested directors or otherwise, both as to action in Indemnitee's official capacity and as to action in any other capacity while holding office for the Corporation, and shall continue as to an Indemnitee who has ceased to be a director or officer, and shall inure

to the benefit of the estate, heirs, executors and administrators of Indemnitee. Nothing contained in this Article IX shall be deemed to prohibit, and the Corporation is specifically authorized to enter into, agreements with officers and directors providing indemnification and advancement rights and procedures different from those set forth in this Article IX. In addition, the Corporation may, to the extent authorized from time to time by the Board, grant indemnification and advancement rights to other employees or agents of the Corporation or other persons serving the Corporation and such rights may be equivalent to, or greater or less than, those set forth in this Article IX.

9.11 PARTIAL INDEMNIFICATION.

If an Indemnitee is entitled under any provision of this Article IX to indemnification by the Corporation for some or a portion of the expenses (including, without limitation, attorneys' fees), liabilities, losses, judgments, fines (including, without limitation, excise taxes and penalties arising under the Employee Retirement Income Security Act of 1974, as amended) or amounts paid in settlement actually and reasonably incurred by or on behalf of Indemnitee in connection with any action, suit, proceeding or investigation and any appeal therefrom but not, however, for the total amount thereof, the Corporation shall nevertheless indemnify Indemnitee for the portion of such expenses (including, without limitation, attorneys' fees), liabilities, losses, judgments, fines (including, without limitation, excise taxes and penalties arising under the Employee Retirement Income Security Act of 1974, as amended) or amounts paid in settlement to which Indemnitee is entitled.

9.12 INSURANCE.

The Corporation may purchase and maintain insurance, at its expense, to protect itself and any director, officer, employee or agent of the Corporation or another corporation, partnership, joint venture, trust or other enterprise (including, without limitation, any employee benefit plan) against any expense, liability or loss incurred by him or her in any such capacity, or arising out of his or her status as such, whether or not the Corporation would have the power to indemnify such person against such expense, liability or loss under the DGCL.

9.13 SAVINGS CLAUSE.

If this Article IX or any portion hereof shall be invalidated on any ground by any court of competent jurisdiction, then the Corporation shall nevertheless indemnify each Indemnitee as to any expenses (including, without limitation, attorneys' fees), liabilities, losses, judgments, fines (including, without limitation, excise taxes and penalties arising under the Employee Retirement Income Security Act of 1974, as amended) and amounts paid in settlement in connection with any action, suit, proceeding or investigation, whether civil, criminal or administrative, including, without limitation, an action by or in the right of the Corporation, to the fullest extent permitted by any applicable portion of this Article IX that shall not have been invalidated and to the fullest extent permitted by applicable law.

9.14 DEFINITIONS.

Terms used in this Article IX and defined in Section 145(h) and Section 145(i) of the DGCL shall have the respective meanings assigned to such terms in such Section 145(h) and Section 145(i).

ARTICLE X - AMENDMENTS.

Subject to the limitations set forth in Section 9.9 of these bylaws or the provisions of the certificate of incorporation, the Board is expressly empowered to adopt, amend or repeal the bylaws of the Corporation. The stockholders also shall have power to adopt, amend or repeal the bylaws of the Corporation; *provided*, *however*, that, in addition to any vote of the holders of any class or series of stock of the Corporation required by law or by the certificate of incorporation, such action by stockholders shall require the affirmative vote of the holders of at least two-thirds in voting power of the outstanding shares of capital stock of the Corporation entitled to vote thereon.

Exhibit 3.5

CERTIFICATE OF AMENDMENT

TO

THIRD AMENDED AND RESTATED CERTIFICATE OF INCORPORATION

OF

PRECISION BIOSCIENCES, INC.

Precision BioSciences, Inc., a corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware (the "Corporation"), DOES HEREBY CERTIFY:

FIRST: That at a meeting of the Board of Directors of the Corporation a resolution was duly adopted recommending and declaring advisable that the Third Amended and Restated Certificate of Incorporation of the Corporation be amended and that such amendments be submitted to the stockholders of the Corporation for their consideration, as follows:

RESOLVED, that subsection (A) of Article IV of the Third Amended and Restated Certificate of Incorporation of the Corporation be amended and restated in its entirety to read as follows:

"Effective on the filing of this Certificate of Amendment to Third Amended and Restated Certificate of Incorporation with the Secretary of State of the State of Delaware (the "**Effective Time**"), a one-for-2.134686 reverse stock split of the Corporation's Common Stock shall become effective, pursuant to which each 2.134686 shares of Common Stock outstanding and held of record by each stockholder of the Corporation (including treasury shares) immediately prior to the Effective Time shall be reclassified and combined into one validly issued, fully-paid and nonassessable share of Common Stock automatically and without any action by the holder thereof upon the Effective Time and shall represent one share of Common Stock from and after the Effective Time (such reclassification and combination of shares, the "**Reverse Stock Split**"). The par value of the Common Stock and the Preferred Stock following the Reverse Stock Split shall remain at $0.000005 and $0.0001 per share, respectively. No fractional shares of Common Stock shall be issued as a result of the Reverse Stock Split and, in lieu thereof, upon surrender after the Effective Time of a certificate which formerly represented shares of Common Stock that were issued and outstanding immediately prior to the Effective Time, any person who would otherwise be entitled to a fractional share of Common Stock as a result of the Reverse Stock Split, following the Effective Time, shall be entitled to receive a cash payment equal to the fraction of which such holder would otherwise be entitled multiplied by the fair value per share as determined by the Board of Directors.

Each stock certificate that, immediately prior to the Effective Time, represented shares of Common Stock that were issued and outstanding immediately prior to the Effective Time shall, from and after the Effective Time, automatically and without the necessity of presenting the same for exchange, represent that number of whole shares of Common Stock after the Effective Time into which the shares formerly represented by such certificate have been reclassified (as well as the right to receive cash in lieu of fractional shares of Common Stock after the Effective Time); provided, however, that each person of record holding a certificate that represented shares of Common Stock that were issued and outstanding immediately prior to the Effective Time shall receive, upon surrender of such certificate, a new certificate evidencing and representing the number of whole shares of Common Stock after the Effective Time into which the shares of Common Stock formerly represented by such certificate shall have been reclassified; and provided further, however, that whether or not fractional shares would be issuable as a result of the Reverse Stock Split shall be determined on the basis of (i) the total number of shares of Common Stock that were issued and outstanding immediately prior to the Effective Time formerly represented by certificates that the holder is at the time surrendering for a new certificate evidencing and representing the number of whole shares of Common Stock after the Effective Time and (ii) the aggregate number of shares of Common Stock after the Effective Time into which the shares of Common Stock formerly represented by such certificates shall have been reclassified.

The total number of shares of all classes of stock which the Corporation shall have authority to issue is 247,606,100, consisting of (i) 200,000,000 shares of Common Stock, $0.000005 par value per share ("**Common Stock**"), and (ii) 47,606,100 shares of Preferred Stock, $0.0001 par value per share ("**Preferred Stock**"), 25,650,000 of which are designated as Series A Preferred Stock and 21,956,100 of which are designated as Series B Preferred Stock.

SECOND: That in lieu of a meeting and vote of stockholders, the stockholders have given written consent to said amendments in accordance with the provisions of Section 228 of the General Corporation Law of the State of Delaware.

THIRD: That the aforesaid amendments were duly adopted in accordance with the applicable provisions of Section 242 of the General Corporation Law of the State of Delaware.

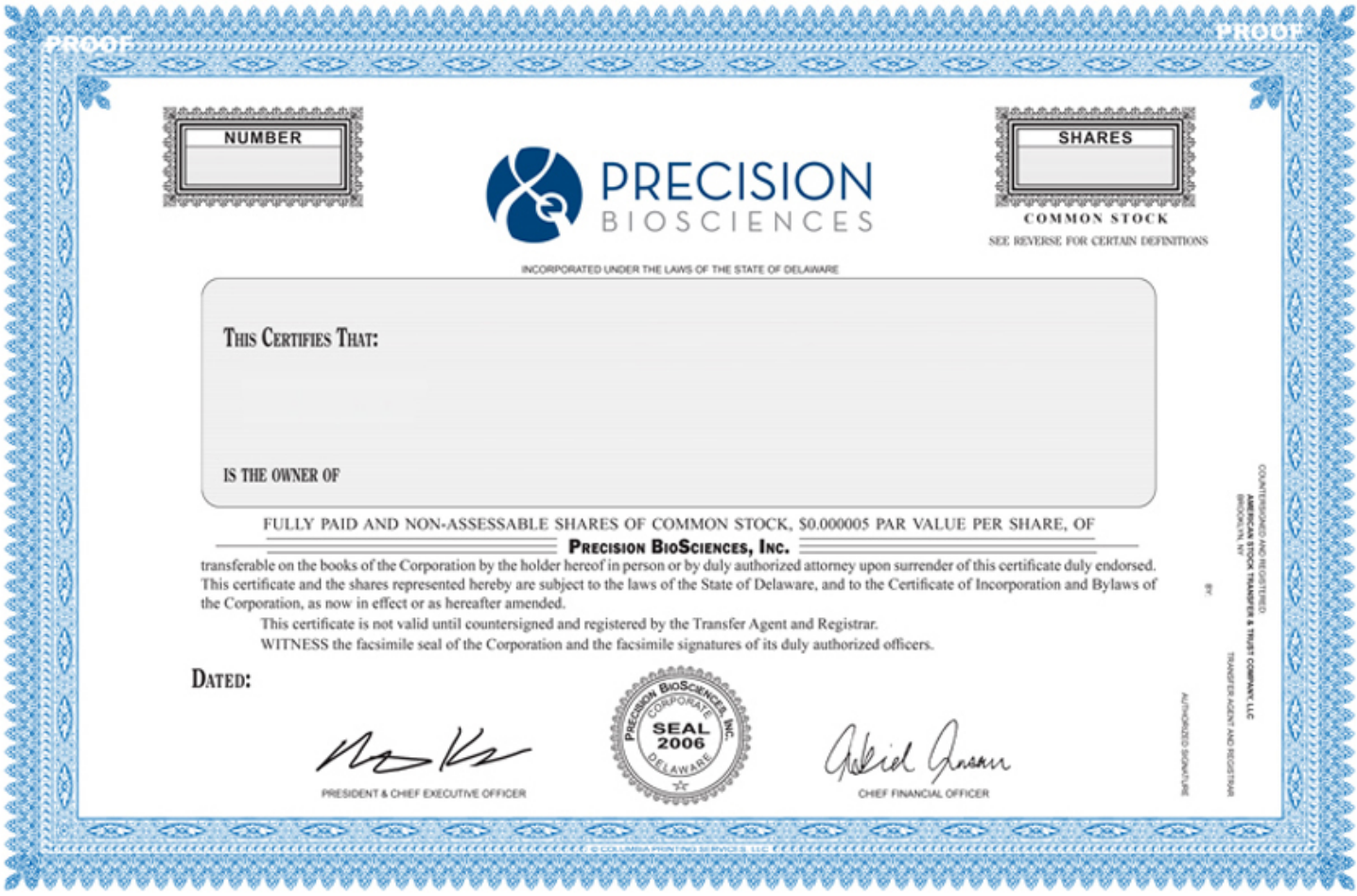
* * *

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be signed by Matthew Kane, the Chief Executive Officer of the Corporation, this 15th day of March, 2019.

PRECISION BIOSCIENCES, INC.

By: /s/ Matthew Kane
Matthew Kane
Chief Executive Officer

Exhibit 4.1


PROOF
PROOF
NUMBER
SHARES
PRECISION BIOSCIENCES
COMMON STOCK
SEE REVERSE FOR CERTAIN DEFINITIONS
INCORPORATED UNDER THE LAWS OF THE STATE OF DELAWARE
THIS CERTIFIES THAT:
IS THE OWNER OF
FULLY PAID AND NON-ASSESSABLE SHARES OF COMMON STOCK, $0.000005 PAR VALUE PER SHARE, OF
PRECISION BIOSCIENCES, INC.
transferable on the books of the Corporation by the holder hereof in person or by duly authorized attorney upon surrender of this certificate duly endorsed. This certificate and the shares represented hereby are subject to the laws of the State of Delaware, and to the Certificate of Incorporation and Bylaws of the Corporation, as now in effect or as hereafter amended.
This certificate is not valid until countersigned and registered by the Transfer Agent and Registrar.
WITNESS the facsimile seal of the Corporation and the facsimile signatures of its duly authorized officers.
DATED:
PRECISION BIOSCIENCES, INC. CORPORATE SEAL 2006 DELAWARE
PRESIDENT & CHIEF EXECUTIVE OFFICER
CHIEF FINANCIAL OFFICER
COUNTERSIGNED AND REGISTERED
AMERICAN STOCK TRANSFER & TRUST COMPANY, LLC
BROOKLYN, NY
BY
TRANSFER AGENT AND REGISTRAR
AUTHORIZED SIGNATURE

THE CORPORATION WILL FURNISH TO ANY STOCKHOLDER, UPON REQUEST AND WITHOUT CHARGE, A FULL STATEMENT OF THE DESIGNATIONS, RELATIVE RIGHTS, PREFERENCES AND LIMITATIONS OF THE SHARES OF EACH CLASS AND SERIES AUTHORIZED TO BE ISSUED, SO FAR AS THE SAME HAVE BEEN DETERMINED, AND OF THE AUTHORITY, IF ANY, OF THE BOARD TO DIVIDE THE SHARES INTO CLASSES OR SERIES AND TO DETERMINE AND CHANGE THE RELATIVE RIGHTS, PREFERENCES AND LIMITATIONS OF ANY CLASS OR SERIES. SUCH REQUEST MAY BE MADE TO THE SECRETARY OF THE CORPORATION OR TO THE TRANSFER AGENT NAMED ON THIS CERTIFICATE.

The following abbreviations, when used in the inscription on the face of this certificate, shall be construed as though they were written out in full according to applicable laws or regulations:

TEN COM	*-*	*as tenants in common*
TEN ENT	*-*	*as tenants by the entireties*
JT TEN	*-*	*as joint tenants with right of survivorship and not as tenants in common*

UNIF GIFT MIN ACT - .....Custodian.....
(Cust) (Minor)
under Uniform Gifts to Minors
Act.....
(State)

Additional abbreviations may also be used though not in the above list.

For Value Received, _____ *hereby sell, assign and transfer unto*

PLEASE INSERT SOCIAL SECURITY OR OTHER IDENTIFYING NUMBER OF ASSIGNEE

_____

(PLEASE PRINT OR TYPEWRITE NAME AND ADDRESS, INCLUDING ZIP CODE, OF ASSIGNEE)

_____

_____

_____ *Shares*
of the stock represented by the within Certificate, and do hereby irrevocably constitute and appoint

_____ *Attorney*
to transfer the said stock on the books of the within named Corporation with full power of substitution in the premises.

Dated _____

_____

NOTICE: THE SIGNATURE(S) TO THIS ASSIGNMENT MUST CORRESPOND WITH THE NAME(S) AS WRITTEN UPON THE FACE OF THE CERTIFICATE, IN EVERY PARTICULAR, WITHOUT ALTERATION OR ENLARGEMENT OR ANY CHANGE WHATSOEVER.

Signature(s) Guaranteed

By _____

The Signature(s) must be guaranteed by an eligible guarantor institution (Banks, Stockbrokers, Savings and Loan Associations and Credit Unions with membership in an approved Signature Guarantee Medallion Program), pursuant to SEC Rule 17Ad-15.

PRECISION BIOSCIENCES, INC.
AMENDED AND RESTATED INVESTORS' RIGHTS AGREEMENT

This AMENDED AND RESTATED INVESTORS' RIGHTS AGREEMENT (the "Agreement") is made as of the 25th day of May, 2018, by and among Precision BioSciences, Inc., a Delaware corporation (the "Company"), the investors listed on Schedule A hereto, each of which is herein referred to as an "Investor" and collectively as the "Investors", and the holders of Common Stock (as defined below) listed on Schedule B hereto, each of which is herein referred to as a "Common Holder" and collectively as the "Common Holders".

RECITALS

WHEREAS, certain of the Investors (the "Existing Investors") and the Common Holders hold shares of the Series A Stock (as defined below) and/or shares of Common Stock issued upon conversion thereof and variously possess registration rights, information rights, right of first offer, and other rights pursuant to an Investors' Rights Agreement dated as of April 29, 2015 between the Company and such Investors and the Common Holders, as amended by the Omnibus Amendment to Investors Rights Agreement, Voting Agreement and ROFR and Co-Sale Agreement dated as of December 21, 2016 (as amended, the "Prior Agreement"); and

WHEREAS, the Existing Investors are holders of at least 58% of the Registrable Securities (as defined in the Prior Agreement) of the Company and desire to amend and restate the Prior Agreement in its entirety and to accept the rights created pursuant to this Agreement in lieu of the rights granted to them under the Prior Agreement; and

WHEREAS, certain of the Investors are parties to that certain Series B Preferred Stock Purchase Agreement of even date herewith between the Company and such Investors (the "Purchase Agreement"), under which the Company's and such Investors' obligations are conditioned upon the execution and delivery of this Agreement by such Investors, Existing Investors holding at least 58% of the Registrable Securities, the Common Holders and the Company;

NOW, THEREFORE, the Company, the Existing Investors and the Common Holders hereby agree that the Prior Agreement shall be amended and restated in its entirety by this Agreement, and the parties to this Agreement further agree as follows:

1. Definitions. For purposes of this Agreement:

(a) "1934 Act" means the Securities Exchange Act of 1934, as amended.

(b) "Act" means the Securities Act of 1933, as amended.

(c) "Affiliate" means, with respect to any Person, any other Person who or which, directly or indirectly, controls, is controlled by, or is under common control with such specified Person, including, without limitation, any general partner, limited partner, member, managing member, employee, officer, director or manager of such Person, or with

respect to F-Prime (as defined below) or any Affiliate of F-Prime only, any trust for the benefit of any of the foregoing or trust for the benefit of any Affiliate of the foregoing, or any venture capital, hedge or private equity style fund now or hereafter existing that is controlled by one or more general partners or managing members of, or is under common investment management with, such Person. For purposes of this definition, the term "control" when used with respect to any Person means the power to direct the management or policies of such Person, directly or indirectly, whether through ownership of voting securities, by contract or otherwise, and the terms "controlling" and "controlled" shall have meanings correlative to the foregoing.

(d) "Board" means the Company's Board of Directors, as constituted from time to time.

(e) "Common Holder Registrable Securities" means (i) the 22,330,742 shares of Common Stock or Common Stock issuable upon the exercise of options held by the Common Holders, and (ii) any Common Stock issued as (or issuable upon the conversion or exercise of any warrant, right, or other security that is issued as) a dividend or other distribution with respect to, or in exchange for or in replacement of such shares.

(f) "Common Stock" means the Company's Common Stock, par value $0.000005 per share.

(g) "Form S-3" means such form under the Act as in effect on the date hereof or any registration form under the Act subsequently adopted by the SEC that permits inclusion or incorporation of substantial information by reference to other documents filed by the Company with the SEC.

(h) "Free Writing Prospectus" means a free-writing prospectus, as defined in Rule 405.

(i) "Holder" means any Person owning or having the right to acquire Registrable Securities or any assignee thereof in accordance with Section 2.10 of this Agreement.

(j) "Initial Offering" means the Company's first firm commitment underwritten public offering of its Common Stock under the Act.

(k) "Key Employee" means the employees of the Company listed on Schedule B attached hereto.

(l) "Person" shall mean any individual, corporation, partnership, trust, limited liability company, association or other entity.

(m) "Preferred Directors" shall have the meaning given to it in the Restated Certificate.

(n) "Preferred Stock" shall mean the Series A Stock and the Series B Stock.

(o) "Register," "registered," and "registration" refer to a registration effected by preparing and filing a registration statement or similar document in compliance with the Act, and the declaration or ordering of effectiveness of such registration statement or document.

(p) "Registrable Securities" means (i) the Common Stock issuable or issued upon conversion of the Preferred Stock, and any Common Stock issued as (or issuable upon conversion or exercise of any warrant, right or other security which is issued as) a dividend or other distribution with respect to, in exchange for or in replacement of such Preferred Stock, and (ii) the Common Holder Registrable Securities, provided, however, that such Common Holder Registrable Securities shall not be deemed Registrable Securities and the Common Holders shall not be deemed Holders for the purposes of Sections 2.1, 2.11 and 4.6 and any Common Stock of the Company issued as (or issuable upon the conversion or exercise of any warrant, right or other security that is issued as) a dividend or other distribution with respect to, or in exchange for, or in replacement of, the shares referenced in (i) and (ii) above, excluding in all cases, however, any Registrable Securities sold by a Person in a transaction in which such Person's rights under Section 2 of this Agreement are not assigned. In addition, the number of shares of Registrable Securities outstanding shall equal the aggregate of the number of shares of Common Stock outstanding that are, and the number of shares of Common Stock issuable pursuant to then exercisable or convertible securities that are, Registrable Securities.

(q) "Required Holders" shall mean the written consent or affirmative vote of the holders of at least sixty percent (60%) of the Registrable Securities issued or issuable upon conversion of the Preferred Stock, given in writing or by vote at a meeting, consenting or voting (as the case may be) together as a single class on an as-converted basis.

(r) "Restated Certificate" shall mean the Company's Third Amended and Restated Certificate of Incorporation, as further amended and/or restated from time to time.

(s) "Rule 144" shall mean Rule 144 under the Act.

(t) "Rule 405" shall mean Rule 405 under the Act.

(u) "SEC" shall mean the Securities and Exchange Commission.

(v) "Series A Stock" means the Company's Series A Preferred Stock, par value $0.0001 per share.

(w) "Series B Stock" means the Company's Series B Preferred Stock, par value $0.0001 per share.

2. Registration Rights. The Company covenants and agrees as follows:

2.1 Request for Registration.

(a) Subject to the conditions of this Section 2.1, if the Company shall receive at any time after the earlier of (i) December 31, 2021 or (ii) six (6) months after the effective date of the Initial Offering, a written request from the Required Holders (for purposes

of this Section 2.1, the "Initiating Holders") that the Company file a registration statement under the Act covering the registration of Registrable Securities with an anticipated aggregate offering price of at least (A) $150,000,000 if such request is received after the date set forth in clause (i) above, but prior to the Initial Offering or (B) $15,000,000 if such request is received after the Initial Offering and the Company is not eligible to register the Registrable Securities on Form S-3, then the Company shall, within twenty (20) days of the receipt thereof, give written notice of such request to all Holders, and subject to the limitations of this Section 2.1, use its best efforts to effect, within ninety (90) days after the date of the request by the Initiating Holders, the registration under the Act of all Registrable Securities that the Holders request to be registered in a written request received by the Company within twenty (20) days of the mailing of the Company's notice pursuant to this Section 2.1(a).

(b) If the Initiating Holders intend to distribute the Registrable Securities covered by their request by means of an underwriting, they shall so advise the Company as a part of their request made pursuant to this Section 2.1, and the Company shall include such information in the written notice referred to in Section 2.1(a). In such event the right of any Holder to include its Registrable Securities in such registration shall be conditioned upon such Holder's participation in such underwriting and the inclusion of such Holder's Registrable Securities in the underwriting (unless otherwise mutually agreed by a majority in interest of the Initiating Holders and such Holder) to the extent provided herein. All Holders proposing to distribute their securities through such underwriting shall enter into an underwriting agreement in customary form with the underwriter or underwriters selected for such underwriting by the Company (which underwriter or underwriters shall be reasonably acceptable to those Initiating Holders holding a majority of the Registrable Securities then held by all Initiating Holders). Notwithstanding any other provision of this Section 2.1, if the underwriter advises the Company that marketing factors require a limitation on the number of securities underwritten (including Registrable Securities), then the Company shall so advise all Holders of Registrable Securities that would otherwise be underwritten pursuant hereto, and the number of shares that may be included in the underwriting shall be allocated to the Holders of such Registrable Securities pro rata based on the number of Registrable Securities held by all such Holders (including the Initiating Holders). In no event shall any Registrable Securities be excluded from such underwriting unless all other securities are first excluded. Any Registrable Securities excluded or withdrawn from such underwriting shall be withdrawn from the registration.

(c) Notwithstanding the foregoing, the Company shall not be required to effect a registration pursuant to this Section 2.1:

(i) in any particular jurisdiction in which the Company would be required to execute a general consent to service of process in effecting such registration, unless the Company is already subject to service in such jurisdiction and except as may be required under the Act; or

(ii) after the Company has effected three (3) registrations pursuant to this Section 2.1, and such registrations have been declared or ordered effective; or

(iii) during the period starting with the date sixty (60) days prior to the Company's good faith estimate of the date of the filing of, and ending on a date one

hundred eighty (180) days following the effective date of, a Company-initiated registration subject to Section 2.2 below, provided that the Company is actively employing in good faith its best efforts to cause such registration statement to become effective; or

(iv) if the Initiating Holders propose to dispose of Registrable Securities that may be registered on Form S-3 pursuant to Section 2.3 hereof; or

(v) if the Company shall furnish to Holders requesting a registration statement pursuant to this Section 2.1 a certificate signed by the Company's Chief Executive Officer stating that in the good faith judgment of the Board, it would be materially detrimental to the Company and its stockholders for such registration statement to either become effective or remain effective for as long as such registration statement otherwise would be required to remain effective, then the Company shall have the right to defer such filing for a period of not more than ninety (90) days after receipt of the request of the Initiating Holders; provided that such right shall be exercised by the Company not more than once in any twelve (12) month period.

2.2 Company Registration.

(a) If (but without any obligation to do so) the Company proposes to register (including for this purpose a registration effected by the Company for stockholders other than the Holders) any of its stock or other securities under the Act in connection with the public offering of such securities (other than (i) a registration relating to a request pursuant to Section 2.1 of this Agreement or (ii) a registration relating solely to the sale of securities of participants in a Company employee benefit or stock ownership plan, a registration relating to a corporate reorganization or transaction under Rule 145 of the Act, a registration on any form that does not include substantially the same information as would be required to be included in a registration statement covering the sale of the Registrable Securities, or a registration in which the only Common Stock being registered is Common Stock issuable upon conversion of debt securities that are also being registered), the Company shall, at such time, promptly give each Holder written notice of such registration. Upon the written request of each Holder given within twenty (20) days after mailing of such notice by the Company in accordance with Section 4.5 of this Agreement, the Company shall, subject to the provisions of Section 2.2(c) of this Agreement, use its best efforts to cause to be registered under the Act all of the Registrable Securities that each such Holder requests to be registered.

(b) Right to Terminate Registration. The Company shall have the right to terminate or withdraw any registration initiated by it under this Section 2.2 prior to the effectiveness of such registration whether or not any Holder has elected to include securities in such registration. The expenses of such withdrawn registration shall be borne by the Company in accordance with Section 2.6 hereof.

(c) Underwriting Requirements. In connection with any offering involving an underwriting of shares of the Company's capital stock, the Company shall not be required under this Section 2.2 to include any of the Holders' Registrable Securities in such underwriting unless they accept the terms of the underwriting as agreed upon between the Company and the underwriters selected by the Company (or by other Persons entitled to select

the underwriters) and enter into an underwriting agreement in customary form with such underwriters. If the total amount of securities, including Registrable Securities, requested by stockholders to be included in such offering exceeds the amount of securities to be sold (other than by the Company) that the underwriters determine in their sole discretion is compatible with the success of the offering, then the Company shall be required to include in the offering only that number of such securities, including Registrable Securities, that the underwriters determine in their sole discretion will not jeopardize the success of the offering. In the event that the underwriters determine that less than all of the Registrable Securities requested to be registered can be included in such offering, then the Registrable Securities that are included in such offering shall be apportioned pro rata among the selling Holders based on the number of Registrable Securities held by all selling Holders or in such other proportions as shall mutually be agreed to by all such selling Holders. Notwithstanding the foregoing, in no event shall (i) any Registrable Securities be excluded from such offering unless all other stockholders' securities have been first excluded from the offering, (ii) the amount of securities of the selling Holders included in the offering be reduced below twenty-five percent (25%) of the total amount of securities included in such offering, unless such offering is the Initial Offering, in which case the selling Holders may be excluded if the underwriters make the determination described above and no other stockholder's securities are included in such offering or (iii) notwithstanding (ii) above, any Registrable Securities which are not Common Holder Registrable Securities be excluded from such underwriting unless all Common Holder Registrable Securities are first excluded from such offering. For purposes of the preceding sentence concerning apportionment, for any selling stockholder that is a Holder of Registrable Securities and that is a venture capital, hedge or private equity style fund, partnership or corporation, the affiliated venture capital, hedge or private equity style funds, partners, members, retired partners and stockholders of such Holder, or the estates and family members of any such partners, members and retired partners and any trusts for the benefit of any of the foregoing Persons, or, with respect to F-Prime or an Affiliate of F-Prime only, any trust for the benefit of any of the foregoing or trust for the benefit of any Affiliate of the foregoing, shall be deemed to be a single "selling Holder," and any pro rata reduction with respect to such "selling Holder" shall be based upon the aggregate amount of Registrable Securities owned by all such related entities and individuals.

2.3 Form S-3 Registration. In case the Company shall receive, at any time after the first anniversary of the Initial Offering, from the Holders of at least twenty-five percent (25%) of the Registrable Securities (for purposes of this Section 2.3, the "S-3 Initiating Holders") a written request or requests that the Company effect a registration on Form S-3 and any related qualification or compliance with respect to all or a part of the Registrable Securities owned by such Holder or Holders, the Company shall:

(a) promptly give written notice of the proposed registration, and any related qualification or compliance, to all other Holders; and

(b) use its best efforts to effect, as soon as practicable, such registration and all such qualifications and compliances as may be so requested and as would permit or facilitate the sale and distribution of all or such portion of such Holders' Registrable Securities as are specified in such request, together with all or such portion of the Registrable Securities of any other Holders joining in such request as are specified in a written request given within fifteen (15) days after receipt of such written notice from the Company; provided,

however, that the Company shall not be obligated to effect any such registration, qualification or compliance, pursuant to this Section 2.3:

(i) if Form S-3 is not available for such offering by the Holders;

(ii) if the Holders, together with the holders of any other securities of the Company entitled to inclusion in such registration, propose to sell Registrable Securities and such other securities (if any) at an aggregate price to the public (net of any underwriters' discounts or commissions) of less than $1,000,000;

(iii) if the Company shall furnish to all Holders requesting a registration statement pursuant to this Section 2.3 a certificate signed by the Company's Chief Executive Officer stating that in the good faith judgment of the Board, it would be materially detrimental to the Company and its stockholders for such registration statement to either become effective or remain effective for as long as such registration statement otherwise would be required to remain effective, then the Company shall have the right to defer such filing for a period of not more than ninety (90) days after receipt of the request of the S-3 Initiating Holders; provided that such right shall be exercised by the Company not more than once in any twelve (12) month period;

(iv) if the Company has, within the twelve (12) month period preceding the date of such request, already effected at least two (2) registrations on Form S-3 pursuant to this Section 2.3 or if the Company has, within the four (4) month period preceding the date of such request, already effected at least one (1) registration on Form S-3 pursuant to this Section 2.3;

(v) in any particular jurisdiction in which the Company would be required to qualify to do business or to execute a general consent to service of process in effecting such registration, qualification or compliance;

(vi) if the Company, within thirty (30) days of receipt of the request of such S-3 Initiating Holders, gives notice of its bona fide intention to effect the filing of a registration statement with the SEC within one hundred twenty (120) days of receipt of such request (other than a registration effected solely to qualify an employee benefit plan or to effect a business combination pursuant to Rule 145), provided that the Company is actively employing in good faith its best efforts to cause such registration statement to become effective; or

(vii) during the period starting with the date thirty (30) days prior to the Company's good faith estimate of the date of the filing of and ending on a date ninety (90) days following the effective date of a Company-initiated registration subject to Section 2.2 of this Agreement, provided that the Company is actively employing in good faith its best efforts to cause such registration statement to become effective.

(c) If the S-3 Initiating Holders intend to distribute the Registrable Securities covered by their request by means of an underwriting, they shall so advise the Company as a part of their request made pursuant to this Section 2.3 and the Company shall include such information in the written notice referred to in Section 2.3(a). The provisions of

Section 2.1(b) of this Agreement shall be applicable to such request (with the substitution of Section 2.3 for references to Section 2.1).

(d) Subject to the foregoing, the Company shall file a registration statement covering the Registrable Securities and other securities so requested to be registered as soon as practicable after receipt of the request or requests of the S-3 Initiating Holders. Registrations effected pursuant to this Section 2.3 shall not be counted as requests for registration effected pursuant to Section 2.1 of this Agreement.

2.4 Obligations of the Company. Whenever required under this Section 2 to effect the registration of any Registrable Securities, the Company shall, as expeditiously as reasonably possible:

(a) prepare and file with the SEC a registration statement with respect to such Registrable Securities and use its best efforts to cause such registration statement to become effective, and, upon the request of the Holders of a majority of the Registrable Securities registered thereunder, keep such registration statement effective for a period of up to one hundred twenty (120) days or, if earlier, until the distribution contemplated in the Registration Statement has been completed;

(b) prepare and file with the SEC such amendments and supplements to such registration statement and the prospectus used in connection with such registration statement as may be necessary to comply with the provisions of the Act in order to enable the disposition of all securities covered by such registration statement;

(c) furnish to the selling Holders such number of copies of a prospectus, including a preliminary prospectus and any Free Writing Prospectus, in conformity with the requirements of the Act, and such other documents as they may reasonably request in order to facilitate the disposition of Registrable Securities owned by them;

(d) use its best efforts to register and qualify the securities covered by such registration statement under such other securities or Blue Sky laws of such jurisdictions as shall be reasonably requested by the Holders, provided that the Company shall not be required in connection therewith or as a condition thereto to qualify to do business or to file a general consent to service of process in any such states or jurisdictions, unless the Company is already subject to service in such jurisdiction and except as may be required by the Act;

(e) in the event of any underwritten public offering, enter into and perform its obligations under an underwriting agreement, in usual and customary form, with the managing underwriter of such offering;

(f) notify each Holder of Registrable Securities covered by such registration statement at any time when a prospectus or Free Writing Prospectus (to the extent prepared by or on behalf of the Company) relating thereto is required to be delivered under the Act of the happening of any event as a result of which the prospectus included in such registration statement, as then in effect, includes an untrue statement of a material fact or omits to state a material fact required to be stated therein or necessary to make the statements therein not misleading in the light of the circumstances then existing, and, at the request of any such

Holder, the Company will, as soon as reasonably practicable, file and furnish to all such Holders a supplement or amendment to such prospectus or Free Writing Prospectus (to the extent prepared by or on behalf of the Company) so that, as thereafter delivered to the purchasers of such Registrable Securities, such prospectus will not contain an untrue statement of a material fact or omit to state any fact necessary to make the statements therein not misleading in light of the circumstances under which they were made;

(g) cause all such Registrable Securities registered pursuant to this Section 2 to be listed on a national exchange or trading system and on each securities exchange and trading system on which similar securities issued by the Company are then listed; and

(h) provide a transfer agent and registrar for all Registrable Securities registered pursuant to this Agreement and a CUSIP number for all such Registrable Securities, in each case not later than the effective date of such registration.

Notwithstanding the provisions of this Section 2, the Company shall be entitled to postpone or suspend, for a reasonable period of time, the filing, effectiveness or use of, or trading under, any registration statement if the Company shall determine that any such filing or the sale of any securities pursuant to such registration statement would in the good faith judgment of the Board:

(i) impede, delay or interfere with any material pending or proposed financing, acquisition, corporate reorganization or other similar transaction involving the Company;

(ii) impair the consummation of any pending or proposed material offering or sale of any class of securities by the Company; or

(iii) require disclosure of material nonpublic information that, if disclosed at such time, would be harmful to the interests of the Company and its stockholders; provided, however, that during any such period all executive officers and directors of the Company are also prohibited from selling securities of the Company (or any security of any of the Company's subsidiaries or affiliates).

In the event of the suspension of effectiveness of any registration statement pursuant to this Section 2.4, the applicable time period during which such registration statement is to remain effective shall be extended by that number of days equal to the number of days the effectiveness of such registration statement was suspended.

2.5 Information from Holder. It shall be a condition precedent to the obligations of the Company to take any action pursuant to this Section 2 with respect to the Registrable Securities of any selling Holder that such Holder shall furnish to the Company such information regarding itself, the Registrable Securities held by it, and the intended method of disposition of such securities as shall be reasonably required to effect the registration of such Holder's Registrable Securities.

2.6 Expenses of Registration. All expenses (other than underwriting discounts and commissions) incurred in connection with registrations, filings or qualifications pursuant to

Sections 2.1, 2.2 and 2.3 of this Agreement, including, without limitation, all registration, filing and qualification fees, printers' and accounting fees, fees and disbursements of counsel for the Company and the reasonable fees and disbursements of one counsel for the selling Holders shall be borne by the Company. Notwithstanding the foregoing, the Company shall not be required to pay for any expenses of any registration proceeding begun pursuant to Section 2.1 or Section 2.3 of this Agreement if the registration request is subsequently withdrawn at the request of the Holders of a majority of the Registrable Securities to be registered (in which case all participating Holders shall bear such expenses pro rata based upon the number of Registrable Securities that were to be included in the withdrawn registration), unless in the case of a registration requested under Section 2.1 or Section 2.3, the Holders of a majority of the Registrable Securities to be registered agree to forfeit their right to one demand registration pursuant to Section 2.1 or Section 2.3, as the case may be; provided, however, that if at the time of such withdrawal, the Holders have learned material adverse information concerning the Company different from that known to the Holders at the time of their request and have withdrawn the request with reasonable promptness following disclosure by the Company of such material adverse information, then the Holders shall not be required to pay any of such expenses and shall retain their rights pursuant to Section 2.1 or Section 2.3 of this Agreement.

2.7 Delay of Registration. No Holder shall have any right to obtain or seek an injunction restraining or otherwise delaying any such registration pursuant to this Agreement as the result of any controversy that might arise with respect to the interpretation or implementation of this Section 2.

2.8 Indemnification. In the event any Registrable Securities are included in a registration statement under this Section 2:

(a) To the extent permitted by law, the Company will indemnify and hold harmless each Holder, severally and not jointly, the partners, members, officers, directors and stockholders of each Holder, legal counsel and accountants for each Holder, any underwriter (as defined in the Act) for such Holder and each Person, if any, who controls such Holder or underwriter within the meaning of the Act or the 1934 Act, against any losses, claims, damages or liabilities (joint or several) to which they may become subject under the Act, the 1934 Act, any state securities laws or any rule or regulation promulgated under the Act, the 1934 Act or any state securities laws, insofar as such losses, claims, damages, or liabilities (or actions or proceedings, whether commenced or threatened, in respect thereof) arise out of or are based upon any of the following statements, omissions or violations (collectively, a "Violation"): (i) any untrue or alleged untrue statement of a material fact contained in such registration statement, including any preliminary prospectus, final prospectus, or Free Writing Prospectus contained therein or any amendments or supplements thereto, any issuer information (as defined in Rule 433 of the Act) filed or required to be filed pursuant to Rule 433(d) under the Act or any other document incident to such registration prepared by or on behalf of the Company or used or referred to by the Company, (ii) the omission or alleged omission of a material fact required to be stated in such registration statement, or necessary to make the statements therein not misleading or (iii) any violation or alleged violation by the Company of the Act, the 1934 Act, any state securities laws or any rule or regulation promulgated under the Act, the 1934 Act or any state securities laws, and the Company will reimburse each such Holder, underwriter, controlling Person or other aforementioned Person for any legal or other expenses reasonably

incurred by them in connection with investigating or defending any such loss, claim, damage, liability, action or proceeding as such expenses are incurred; provided, however, that the indemnity agreement contained in this Section 2.8(a) shall not apply to amounts paid in settlement of any such loss, claim, damage, liability, action or proceeding if such settlement is effected without the consent of the Company (which consent shall not be unreasonably withheld), nor shall the Company be liable in any such case for any such loss, claim, damage, liability, action or proceeding to the extent that it arises out of or is based upon a Violation that occurs in reliance upon, and in conformity with, written information furnished expressly for use in connection with such registration by any such Holder, underwriter, controlling Person or other aforementioned Person.

(b) To the extent permitted by law, each selling Holder will indemnify and hold harmless the Company, each of its directors, each of its officers who has signed the registration statement, each Person, if any, who controls the Company within the meaning of the Act, legal counsel and accountants for the Company, any underwriter, any other Holder selling securities in such registration statement and any controlling Person of any such underwriter or other Holder, against any losses, claims, damages or liabilities (joint or several) to which any of the foregoing Persons may become subject, under the Act, the 1934 Act, any state securities laws or any rule or regulation promulgated under the Act, the 1934 Act or any state securities laws, insofar as such losses, claims, damages or liabilities (or actions or proceedings, whether commenced or threatened, in respect thereof) arise out of or are based upon any Violation, in each case to the extent (and only to the extent) that such Violation occurs in reliance upon and in conformity with written information furnished by such Holder expressly for use in connection with such registration; and each such Holder will reimburse any Person intended to be indemnified pursuant to this Section 2.8(b) for any legal or other expenses reasonably incurred by such Person in connection with investigating or defending any such loss, claim, damage, liability, action or proceeding as such expenses are incurred; provided, however, that the indemnity agreement contained in this Section 2.8(b) shall not apply to amounts paid in settlement of any such loss, claim, damage, liability, action or proceeding if such settlement is effected without the consent of the Holder (which consent shall not be unreasonably withheld), and provided that in no event shall any indemnity under this Section 2.8(b) exceed the net proceeds from the offering received by such Holder, except in the case of fraud or willful misconduct by such Holder.

(c) Promptly after receipt by an indemnified party under this Section 2.8 of notice of the commencement of any action or proceeding (including any governmental action or proceeding) for which a party may be entitled to indemnification, such indemnified party will, if a claim in respect thereof is to be made against any indemnifying party under this Section 2.8, deliver to the indemnifying party a written notice of the commencement thereof and the indemnifying party shall have the right to participate in and, to the extent the indemnifying party so desires, jointly with any other indemnifying party similarly noticed, to assume the defense thereof with counsel mutually satisfactory to the parties; provided, however, that an indemnified party (together with all other indemnified parties that may be represented without conflict by one counsel) shall have the right to retain one (1) separate counsel, with the fees and expenses to be paid by the indemnifying party, if representation of such indemnified party by the counsel retained by the indemnifying party would be inappropriate due to actual or potential differing interests between such indemnified party and any other party represented by

such counsel in such proceeding. The failure to deliver written notice to the indemnifying party within a reasonable time of the commencement of any such action or proceeding, if prejudicial to its ability to defend such action or proceeding, shall relieve such indemnifying party of any liability to the indemnified party under this Section 2.8 but only to the extent of such prejudice; provided, however, that the omission to so deliver written notice to the indemnifying party will not relieve such indemnifying party of any liability that it may have to any indemnified party otherwise than under this Section 2.8.

(d) If the indemnification provided for in this Section 2.8 is held by a court of competent jurisdiction to be unavailable to an indemnified party with respect to any loss, liability, claim, damage or expense referred to herein, then the indemnifying party, in lieu of indemnifying such indemnified party hereunder, shall contribute to the amount paid or payable by such indemnified party as a result of such loss, liability, claim, damage or expense in such proportion as is appropriate to reflect the relative fault of the indemnifying party on the one hand and the indemnified party on the other hand in connection with the statements or omissions that resulted in such loss, liability, claim, damage or expense, as well as any other relevant equitable considerations; provided, however, that (i) no contribution by any Holder, when combined with any amounts paid by such Holder pursuant to Section 2.8(b), shall exceed the net proceeds from the offering received by such Holder and (ii) no Person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Act) will be entitled to contribution from any Person who was not guilty of such fraudulent misrepresentation; and provided further that in no event shall a Holder's liability pursuant to this Section 2.8(d), when combined with the amounts paid or payable by such Holder pursuant to Section 2.8(b), exceed the proceeds from the offering received by such Holder (net of any expenses paid by such Holder). The relative fault of the indemnifying party and the indemnified party shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or the omission or alleged omission to state a material fact relates to information supplied by the indemnifying party or by the indemnified party and the parties' relative intent, knowledge, access to information and opportunity to correct or prevent such statement or omission.

(e) Notwithstanding the foregoing, to the extent that the provisions on indemnification and contribution contained in the underwriting agreement entered into in connection with the underwritten public offering are in conflict with the foregoing provisions, the provisions in the underwriting agreement shall control.

(f) Unless otherwise superseded by an underwriting agreement entered into in connection with the underwritten public offering, the obligations of the Company and Holders under this Section 2.8 shall survive the completion of any offering of Registrable Securities in a registration statement under this Section 2 and otherwise shall survive the termination of this Agreement.

2.9 Reports Under the 1934 Act. With a view to making available to the Holders the benefits of Rule 144 and any other rule or regulation of the SEC that may at any time permit a Holder to sell securities of the Company to the public without registration or pursuant to a registration on Form S-3, the Company agrees to:

(a) make and keep public information available, as those terms are understood and defined in Rule 144, at all times after the effective date of the registration statement filed by the Company for the Initial Offering;

(b) use best efforts to file with the SEC in a timely manner all reports and other documents required of the Company under the Act and the 1934 Act (at any time after the Company has become subject to such reporting requirements); and

(c) furnish to any Holder, so long as the Holder owns any Registrable Securities, forthwith upon request (i) to the extent accurate, a written statement by the Company that it has complied with the reporting requirements of Rule 144 (at any time after ninety (90) days after the effective date of the first registration statement filed by the Company), the Act and the 1934 Act (at any time after it has become subject to such reporting requirements), or that it qualifies as a registrant whose securities may be resold pursuant to Form S-3 (at any time after it so qualifies), (ii) a copy of the most recent annual or quarterly report of the Company and such other reports and documents so filed by the Company and (iii) such other information as may be reasonably requested to avail any Holder of any rule or regulation of the SEC that permits the selling of any such securities without registration (at any time after the Company has become subject to the reporting requirements under the Exchange Act) or pursuant to Form S-3 (at any time after the Company so qualifies to use such form).

2.10 Assignment of Registration Rights. The rights to cause the Company to register Registrable Securities pursuant to this Section 2 may be assigned (but only with all related obligations) by a Holder to a transferee or assignee of such securities that after such transfer, holds at least 100,000 shares of Registrable Securities (subject to appropriate adjustment for stock splits, stock dividends, combinations, and other recapitalizations), provided: (a) the Company is, within a reasonable time prior to such transfer, furnished with written notice of the name and address of such transferee or assignee and the securities with respect to which such registration rights are being assigned; (b) such transferee or assignee agrees in writing to be bound by and subject to the terms and conditions of this Agreement, including, without limitation, the provisions of Section 2.12 of this Agreement; and (c) such transferee or assignee is not a person deemed by the Board, in its reasonable judgment, to be a competitor or potential competitor of the Company; provided, however, that for purposes of this Section 2.10 "competitor" of the Company shall not include Gilead Sciences, Inc. ("Gilead") or any other entity that is wholly-owned, either directly or indirectly, by Gilead as of the date of this Agreement. Notwithstanding the limitation set forth in the foregoing sentence respecting the minimum number of shares which must be transferred, any Holder that (i) is a partnership, limited liability company or corporation may transfer such Holder's Registration rights to (A) entities affiliated directly or indirectly with such partnership (or its manager), limited liability company or corporation, (B) any partner (or retired partner or incoming partner), member (or retired member) or stockholder of such partnership, limited liability company or corporation, (C) the spouse, siblings, lineal descendants or ancestors of any such partner (or retired partner), member (or retired member) or stockholder, (D) the estate of any such partner (or retired partner), member (or retired member) or stockholder, (E) any custodian or trustee for the benefit of any such partner (or retired partner), member (or retired member) or stockholder or the spouse, siblings, lineal descendants or ancestors of any such partner (or retired partner), member (or retired member) or stockholder, as the case may be and (F) any Affiliate, or (ii) holds shares

in its capacity as trustee, manager or custodian of a trust, may transfer such Holder's rights to cause the Company to register Registrable Securities to a replacement trustee, manager or custodian of the relevant trust, in each case, without restriction as to the number or percentage of shares acquired by any such transferee.

2.11 Limitations on Subsequent Registration Rights. From and after the date of this Agreement, the Company shall not, without the prior written consent of the Required Holders, enter into any agreement with any holder or prospective holder of any securities of the Company that would allow such holder or prospective holder (a) to include any of such securities in any registration filed under Section 2.1, Section 2.2 or Section 2.3 of this Agreement, unless under the terms of such agreement, such holder or prospective holder may include such securities in any such registration only to the extent that the inclusion of such securities will not reduce the amount of the Registrable Securities of the Holders that are included or (b) to demand registration of their securities.

2.12 "Market Stand-Off" Agreement.

(a) Each Holder hereby agrees that it will not, without the prior written consent of the managing underwriter, during the period commencing on the date of the final prospectus relating to the Initial Offering and ending on the date specified by the Company and the managing underwriter (such period not to exceed one hundred eighty (180) days) (i) lend, offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, any shares of Common Stock or any securities convertible into or exercisable or exchangeable for Common Stock, in each case, held immediately before the effective date of the registration statement for such offering, or (ii) enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of the Common Stock, whether any such transaction described in clause (i) or (ii) above is to be settled by delivery of Common Stock or other securities, in cash or otherwise. The foregoing provisions of this Section 2.12 shall apply only to the Initial Offering, shall not apply to the sale of any shares to an underwriter pursuant to an underwriting agreement, and shall only be applicable to the Holders if all officers and directors are subject to the same restrictions and the Company uses best efforts to obtain a similar agreement from all stockholders individually owning greater than one percent (1%) of the Company's outstanding Common Stock (after giving effect to conversion into Common Stock of all outstanding Preferred Stock). The underwriters in connection with the Initial Offering are intended third-party beneficiaries of this Section 2.12 and shall have the right, power and authority to enforce the provisions hereof as though they were a party hereto. Each Holder further agrees to execute such agreements as may be reasonably requested by the underwriters in the Initial Offering that are consistent with this Section 2.12 or that are necessary to give further effect thereto. Any discretionary waiver or termination of the restrictions of any or all of such agreements by the Company or the underwriters shall apply to all Holders subject to such agreements pro rata based on the number of shares subject to such agreements.

In order to enforce the foregoing covenant, the Company may impose stop-transfer instructions with respect to the Registrable Securities of each Holder (and the

shares or securities of every other Person subject to the foregoing restriction) until the end of such period.

(b) Each Holder agrees that a legend reading substantially as follows shall be placed on all certificates representing all shares or securities of the Company of each Holder (and the shares or securities of every other Person subject to the restriction contained in this Section 2.12):

THE SECURITIES REPRESENTED BY THIS CERTIFICATE ARE SUBJECT TO A LOCK-UP PERIOD AFTER THE EFFECTIVE DATE OF THE ISSUER'S REGISTRATION STATEMENT FILED UNDER THE SECURITIES ACT OF 1933, AS AMENDED, AS SET FORTH IN AN AGREEMENT BETWEEN THE COMPANY AND THE ORIGINAL HOLDER OF THESE SECURITIES, A COPY OF WHICH MAY BE OBTAINED AT THE ISSUER'S PRINCIPAL OFFICE. SUCH LOCK-UP PERIOD IS BINDING ON TRANSFEREES OF THESE SHARES.

2.13 Termination of Registration Rights. No Holder shall be entitled to exercise any right provided for in this Section 2: (a) after five (5) years following the consummation of a firm commitment underwritten public offering of shares of Common Stock of the Company at a price per share to the public of at least $6.01 (adjusted for stock splits, stock dividends, recapitalizations and similar events, including any such events to be effected in connection with such offering) resulting in aggregate proceeds to the Company (net of the underwriting discounts or commissions and offering expenses) of not less than $50,000,000 (a "Qualified IPO") or (b) as to any Holder, such time following a Qualified IPO at which both (i) such Holder (together with its Affiliates) holds one percent (1%) or less of the Company's outstanding Common Stock and (ii) all Registrable Securities held by such Holder (together with any Affiliate of the Holder with whom such Holder must aggregate its sales under Rule 144) can be sold in any three (3) month period without registration or volume limitations in compliance with Rule 144.

3. Covenants of the Company.

3.1 Delivery of Financial Statements.

(a) The Company shall deliver to each Investor (or transferee of an Investor):

(i) as soon as practicable, but in any event within one hundred twenty (120) days after the end of each fiscal year of the Company, a consolidated income statement for such fiscal year, a consolidated balance sheet of the Company and consolidated statement of stockholders' equity as of the end of such year, and a consolidated statement of cash flows for such year, such year-end financial reports to be in reasonable detail, prepared in accordance with generally accepted accounting principles ("GAAP"), audited and certified by independent public accountants of nationally recognized standing selected by the Company; and

(ii) as soon as practicable, but in any event within forty-five (45) days after the end of each of the first three (3) quarters of each fiscal year of the Company,

an unaudited consolidated income statement and statement of cash flows for such fiscal quarter and for the current fiscal year to date, and an unaudited balance sheet as of the end of such fiscal quarter (the "Quarterly Financial Statements"), all prepared in accordance with GAAP (except that such financial statements may (A) be subject to normal year-end audit adjustments and (B) not contain all notes thereto that may be required in accordance with GAAP).

(b) The Company shall deliver to each Investor (or transferee of an Investor) that holds at least 1,000,000 shares of Registrable Securities (appropriately adjusted for any stock split, dividend, combination or other recapitalization) (a "Major Investor"):

(i) as soon as practicable, but in any event at least thirty (30) days prior to the end of each fiscal year, an operating budget and business plan (the "Business Plan") for the next fiscal year, approved by the Board and prepared on a quarterly basis, as well as a summary of the Business Plan together with any update of the Business Plan as such update is prepared, including consolidated balance sheets, income statements and statements of cash flows for such months and, as soon as prepared, any other budgets or revised budgets prepared by the Company;

(ii) concurrently with the delivery of the Quarterly Financial Statements, a comparison of the Quarterly Financial Statements against the Business Plan, as then updated and in effect;

(iii) such other information relating to the financial condition, business or corporate affairs of the Company as the Major Investor may from time to time reasonably request; provided, however, that the Company shall not be obligated under this subsection (ii) to provide information that (A) it deems in good faith to be a trade secret or similar confidential information or (B) the disclosure of which would adversely affect the attorney-client privilege between the Company and its counsel.

3.2 Inspection. The Company shall permit each Major Investor, at such Major Investor's expense, and after reasonable notice provided by such Major Investor, to visit and inspect the Company's properties, to examine its books of account and records and to discuss the Company's affairs, finances and accounts with its officers, all at such reasonable times as may be requested by the Major Investor; provided, however, that the Company shall not be obligated pursuant to this Section 3.2 to provide access to any information that (A) it deems in good faith to be a trade secret or similar confidential information or (B) the disclosure of which would adversely affect the attorney-client privilege between the Company and its counsel.

3.3 Observer Rights. As long as F-Prime Capital Partners Healthcare Fund IV LP, together with its Affiliates ("F-Prime"), owns not less than 1,500,000 shares of Preferred Stock (as adjusted for stock dividends, combinations, splits or the like), the Company shall invite a representative of F-Prime (the "F-Prime Investor Observer") to attend all meetings of its Board in a nonvoting observer capacity. As long as Brace Pharmaceuticals LLC, together with its Affiliates ("Brace"), owns not less than 1,500,000 shares of Preferred Stock (as adjusted for stock dividends, combinations, splits or the like), the Company shall invite a representative of Brace (the "Brace Investor Observer") to attend all meetings of its Board in a nonvoting capacity. As long as Cowen Healthcare Investments II LP and CHI EF II LP, together with their

Affiliates ("Cowen"), owns not less than 1,500,000 shares of Preferred Stock (as adjusted for stock dividends, combinations, splits or the like), the Company shall invite a representative of Cowen (the "Cowen Investor Observer" and together with the F-Prime Investor Observer and the Brace Observer, the "Investor Observers" and each an "Investor Observer") to attend all meetings of its Board in a nonvoting observer capacity. The initial F-Prime Investor Observer shall be Ben Auspitz. The initial Brace Investor Observer shall be Todd Brady. In this respect, the Company shall give each Investor Observer copies of all notices and other materials that it provides to its directors at the same time and in the same manner as provided to such directors; provided, however, that such representative shall agree to hold in confidence and trust and to act as a fiduciary with the same standard of care as a member of the Board with respect to all information so provided; and provided further, that the Company reserves the right to exclude any Investor Observer from any meeting, or any portion thereof, and/or to exclude some or all of the materials to be sent to such Investor Observer, if the Board determines in good faith that attendance at such meeting, or portion thereof, and/or providing such materials or any portion thereof, could materially and adversely affect the Company, whether by way of adversely affecting the attorney-client privilege between the Company and its counsel, or otherwise.

3.4 Termination of Information, Inspection and Observer Covenants. The covenants set forth in Sections 3.1, 3.2 and 3.3 shall terminate and be of no further force or effect upon the earlier to occur of (a) the consummation of a Qualified IPO, (b) when the Company first becomes subject to the periodic reporting requirements of Sections 12(g) or 15(d) of the 1934 Act and (c) the consummation of a Liquidation Event, as that term is defined in the Restated Certificate, whichever event shall first occur. The confidentiality provisions under Section 3.3 will survive any such termination.

3.5 Right of First Offer. Subject to the terms and conditions specified in this Section 3.5, the Company hereby grants to each Major Investor a right of first offer with respect to future sales by the Company of its Shares (as hereinafter defined). A Major Investor shall be entitled to apportion the right of first offer hereby granted it among itself and its partners and Affiliates in such proportions as it deems appropriate.

Each time the Company proposes to offer any shares of, or securities convertible into or exchangeable or exercisable for any shares of, its capital stock ("Shares"), the Company shall first make an offering of such Shares to each Major Investor in accordance with the following provisions:

(a) The Company shall deliver a notice in accordance with Section 4.5 ("Notice") to the Major Investors stating (i) its bona fide intention to offer such Shares, (ii) the number of such Shares to be offered and (iii) the price and terms upon which it proposes to offer such Shares.

(b) By written notification received by the Company within thirty (30) calendar days after the giving of Notice, each Major Investor may elect to purchase, at the price and on the terms specified in the Notice, up to that portion of such Shares that equals the proportion that the number of shares of Registrable Securities issued and held by such Investor (assuming full conversion and exercise of all convertible and exercisable securities then outstanding, but excluding unexercised options) bears to the total number of shares of Common

Stock of the Company then outstanding (assuming full conversion and exercise of all convertible and exercisable securities then outstanding, but excluding unexercised options). At the expiration of such thirty (30) calendar day period, the Company shall promptly, in writing, notify each Major Investor that elects to purchase all the shares available to it (a "Fully-Exercising Investor") of any other Major Investor's failure to do likewise. During the fifteen (15) calendar day period commencing after the Company has given such notice to the Fully-Exercising Investors, each Fully-Exercising Investor may elect to purchase that portion of the Shares for which Major Investors were entitled to subscribe, but which were not subscribed for by the Major Investors, that is equal to the proportion that the number of shares of Registrable Securities issued and held by such Fully-Exercising Investor bears to the total number of shares of Common Stock issued and held, or issuable upon conversion of the Preferred Stock then held, by all Fully-Exercising Investors who wish to purchase some of the unsubscribed shares.

(c) If all Shares that Major Investors are entitled to obtain pursuant to Section 3.5(b) of this Agreement are not elected to be obtained as provided in Section 3.5(b) of this Agreement, the Company may, during the sixty (60) day period following the expiration of the period provided in Section 3.5(b) of this Agreement, offer the remaining unsubscribed portion of such Shares to any Person or Persons at a price not less than that, and upon terms no more favorable to the offeree than those, specified in the Notice. If the Company does not enter into an agreement for the sale of the Shares within such period, or if such agreement is not consummated within thirty (30) days of the execution thereof, the right provided hereunder shall be deemed to be revived and such Shares shall not be offered unless first reoffered to the Investors in accordance herewith.

(d) The right of first offer in this Section 3.5 shall not be applicable to (i) Shares issued as a dividend or distribution on Preferred Stock or upon conversion of the Preferred Stock; (ii) Shares issued pursuant to a transaction described in Article IV.B Section 4(d)(i) of the Restated Certificate; (iii) Shares issued or granted to employees, directors, consultants and other service providers for the primary purpose of soliciting or retaining their services pursuant to this Corporation's equity incentive or option plans or any other plan or agreement approved by the Board (including the approval of at least one Preferred Director); (iv) Common Stock issued to the public in a firm commitment underwritten public offering pursuant to an effective registration statement filed under the Securities Act of 1933, as amended; (v) Shares issued pursuant to the conversion or exercise of convertible or exercisable securities outstanding as of the date of this Agreement or excluded from the rights of first offer pursuant to this Section 3.5(d); (vi) Shares issued in connection with a bona fide business acquisition by the Company, whether by merger, consolidation, sale of assets, sale or exchange of stock or otherwise, provided that such issuance is approved by the Board (including the approval of at least one Preferred Director); (vii) Shares issued pursuant to any equipment leasing arrangement, real estate, bank financing or similar arrangement, which arrangement is approved by the Board (including the approval of at least one Preferred Director); (viii) Shares issued to persons or entities with which this Corporation has business or partnering relationships, provided such issuances are approved by the Board (including the approval of at least one Preferred Director) and are primarily for non-equity financing purposes; (ix) the issuance of shares of Series B Stock to Additional Purchasers pursuant to Section 1.3 of the Purchase Agreement or (x) shares of Common Stock issued in a Qualified IPO. In addition to the foregoing, the right of first offer in this Section 3.5 shall not be applicable with respect to any Investor in any subsequent offering of

Shares if (i) at the time of such offering, the Investor is not an "accredited investor," as that term is then defined in Rule 501(a) of the Act and (ii) such offering of Shares is otherwise being offered only to accredited investors.

(e) The rights provided in this Section 3.5 may not be assigned or transferred by any Major Investor; provided, however, that a Major Investor that is a venture capital, hedge or private equity style fund may assign or transfer such rights to its Affiliates.

(f) The covenants set forth in this Section 3.5 shall terminate and be of no further force or effect upon the consummation of (i) a Qualified IPO or (ii) a Liquidation Event, as that term is defined in the Restated Certificate.

3.6 Insurance.

(a) Key-Person Insurance. The Company has as of the date hereof term life insurance on the life of Derek Jantz in an amount of at least $1,000,000. Such policies are owned by the Company and name the Company as loss payee. The Company will use its best efforts to cause such term life insurance policies be maintained until such time as the Board determines that such insurance should be discontinued.

(b) Directors' and Officers' Insurance. The Company has as of the date hereof directors' and officers' liability insurance in an amount equal to $3,000,000. The Company will use its best efforts to cause such insurance policy be maintained until such time as the Board determines that such insurance should be discontinued.

3.7 Proprietary Information and Inventions Agreements. The Company shall require all employees and consultants with access to confidential information to execute and deliver a Proprietary Information and Inventions Agreement in substantially the form approved by the Board or a consulting agreement containing substantially similar proprietary rights assignment and confidentiality provisions.

3.8 Matters Requiring Director Approval. So long as the holders of Preferred Stock are entitled to elect a Preferred Director, the Company hereby covenants and agrees with each of the Investors that it shall not, without approval of the Board, including at least one Preferred Director:

(a) make, or permit any subsidiary to make, any loan or advance to, or own any stock or other securities of, any subsidiary or other corporation, partnership, or other entity unless it is wholly owned by the Company;

(b) make, or permit any subsidiary to make, any loan or advance to any Person, including, without limitation, any employee or director of the Company or any subsidiary, except advances and similar expenditures in the ordinary course of business or under the terms of an employee stock or option plan approved by the Board;

(c) incur, guarantee, directly or indirectly, or permit any subsidiary to incur, guarantee, directly or indirectly, any indebtedness (including operating and capital leases)

greater than $5,000,000 except for trade accounts of the Company or any subsidiary arising in the ordinary course of business;

(d) otherwise enter into or be a party to any transaction with any director, officer, or employee of the Company or any "associate" (as defined in Rule 12b-2 promulgated under the 1934 Act) of any such Person, except for transactions contemplated by this Agreement, the Purchase Agreement, that certain Amended and Restated Voting Agreement executed as of even date herewith, and that certain Amended and Restated Right of First Refusal and Co-Sale Agreement executed as of even date herewith or transactions made in the ordinary course of business and pursuant to reasonable requirements of the Company's business and upon fair and reasonable terms that are approved by a majority of the Board;

(e) hire, terminate, or materially change the compensation of the executive officers, including approving any option grants or stock awards to executive officers;

(f) materially change the principal business of the Company, enter new lines of business, or exit the current line of business;

(g) create any subsidiary of the Corporation; or

(h) enter into any corporate strategic relationship involving the payment, contribution, or assignment by the Company or to the Company of money or assets greater than $5,000,000.

3.9 Board Matters. Unless otherwise determined by the vote of a majority of the directors then in office, the Board shall meet at least quarterly in accordance with an agreed-upon schedule. The Company shall reimburse the nonemployee directors and any person with contractual board observer rights for all reasonable out-of-pocket travel and other expenses incurred (consistent with the Company's travel policy, if any) in support of the Company or in connection with the performance of duties as directors, including, without limitation, attending meetings of the Board or committees thereof. Promptly after the date hereof, the Board will form compensation, audit and nominating and corporate governance committees.

3.10 Successor Indemnification. If the Company or any of its successors or assignees consolidates with or merges into any other Person or entity and is not the continuing or surviving corporation or entity of such consolidation or merger, then to the extent necessary, proper provision shall be made so that the successors and assignees of the Company assume the obligations of the Company with respect to indemnification of members of the Board as in effect immediately before such transaction, whether such obligations are contained in the Company's Bylaws, its Certificate of Incorporation, or elsewhere, as the case may be.

3.11 Confidentiality. Each Investor agrees, severally and not jointly, to use the same degree of care as such Investor uses to protect its own confidential information for any information obtained pursuant to this Agreement or otherwise as a stockholder of the Company which the Company identifies in writing as being proprietary or confidential and such Investor acknowledges that it will not, unless otherwise required by law or the rules of any national securities exchange, association or marketplace, disclose such information without the prior written consent of the Company except such information that (a) was in the public domain prior

to the time it was furnished to such Investor, (b) is or becomes (through no willful improper action or inaction by such Investor) generally available to the public, (c) was in its possession or known by such Investor without restriction prior to receipt from the Company, (d) was rightfully disclosed to such Investor by a third party without restriction or (e) was independently developed without any use of the Company's confidential information. Notwithstanding the foregoing, each Investor that is a limited partnership or limited liability company may disclose such proprietary or confidential information to any former partners or members who retained an economic interest in such Investor, current or prospective partner of the partnership or any subsequent partnership under common investment management, limited partner, general partner, member or management company of such Investor (or any employee or representative of any of the foregoing) (each of the foregoing Persons, a "Permitted Disclosee") or legal counsel, accountants or representatives for such Investor. Furthermore, nothing contained herein shall prevent any Investor or any Permitted Disclosee from (i) entering into any business, entering into any agreement with a third party, or investing in or engaging in investment discussions with any other company (whether or not competitive with the Company), provided that such Investor or Permitted Disclosee does not, except as permitted in accordance with this Section 3.11, disclose or otherwise make use of any proprietary or confidential information of the Company in connection with such activities, or (ii) making any disclosures required by law, rule, regulation or court or other governmental order.

3.12 Bad Actor Status. The Company will notify the Investors promptly in writing in the event the Company has knowledge that a "Bad Actor" disqualifying event described in Rule 506(d)(1)(i) to (viii) of the Securities Act (a "Disqualification Event") becomes applicable to the Company, except for a Disqualification Event as to which Rule 506(d)(2)(ii)-(iv) or (d)(3) is applicable.

3.13 Employee Agreements. The Company will cause (i) each person now or hereafter employed by it or by any subsidiary (or engaged by the Company or any subsidiary as a consultant/independent contractor) with access to confidential information and/or trade secrets to enter into a nondisclosure and proprietary rights assignment agreement; and (ii) each Key Employee to enter into a one (1) year noncompetition and nonsolicitation agreement, substantially in the form approved by the Board, provided, however, that any employee that has entered into an employment agreement with the Company that contains provisions regarding the subject matter in the foregoing clauses (i) and (ii) shall not be required to enter into a nondisclosure and proprietary rights assignment agreement or enter into a noncompetition and nonsolicitation agreement. In addition, the Company shall not amend, modify, terminate, waive, or otherwise alter, in whole or in part, any of the above-referenced agreements or any restricted stock agreement between the Company and any employee, without the consent of at least one Preferred Director.

3.14 Employee Stock. Unless otherwise approved by the Board, including at least one Preferred Director, all future employees and consultants of the Company who purchase, receive options to purchase, or receive awards of shares of the Company's capital stock after the date hereof shall be required to execute restricted stock or option agreements, as applicable, providing for (i) vesting of shares over a four (4) year period, with the first twenty-five percent (25%) of such shares vesting following twelve (12) months of continued employment or service, and the remaining shares vesting in equal monthly installments over the following thirty-six (36)

months, and (ii) a market stand-off provision substantially similar to that in Section 2.12. In addition, unless otherwise approved by the Board, including at least one Preferred Director, the Company shall retain a "right of first refusal" on employee transfers until the Initial Offering and shall have the right to repurchase unvested shares at cost upon termination of employment of a holder of restricted stock.

3.15 Indemnification Matters. The Company hereby acknowledges that one (1) or more of the directors nominated to serve on the Board by the Investors (each a "Fund Director") may have certain rights to indemnification, advancement of expenses and/or insurance provided by one or more of the Investors and certain of their affiliates (collectively, the "Fund Indemnitors"). The Company hereby agrees (a) that it is the indemnitor of first resort (*i.e.*, its obligations to any such Fund Director are primary and any obligation of the Fund Indemnitors to advance expenses or to provide indemnification for the same expenses or liabilities incurred by such Fund Director are secondary), (b) that it shall be required to advance the full amount of expenses incurred by such Fund Director and shall be liable for the full amount of all expenses, judgments, penalties, fines and amounts paid in settlement by or on behalf of any such Fund Director to the extent legally permitted and as required by the Restated Certificate (or any agreement between the Company and such Fund Director), without regard to any rights such Fund Director may have against the Fund Indemnitors, and, (c) that it irrevocably waives, relinquishes and releases the Fund Indemnitors from any and all claims against the Fund Indemnitors for contribution, subrogation or any other recovery of any kind in respect thereof. The Company further agrees that no advancement or payment by the Fund Indemnitors on behalf of any such Fund Director with respect to any claim for which such Fund Director has sought indemnification from the Company shall affect the foregoing and the Fund Indemnitors shall have a right of contribution and/or be subrogated to the extent of such advancement or payment to all of the rights of recovery of such Fund Director against the Company.

3.16 Right to Conduct Activities. The Company hereby agrees and acknowledges that (A) each of ArrowMark Colorado Holdings, LLC (together with its Affiliates "AP"), venBio Partners, LLC (together with its Affiliates, "venBio"), Osage University Partners II (together with its Affiliates, "Osage"), G LTP LLC, G HSP LLC, G ERP LLC and G JBD LLC (together with their Affiliates, "DUMAC"), RA Capital Healthcare Fund, L.P. (together with its Affiliates, "RA Capital"), Franklin Strategic Series – Franklin Biotechnology Discovery Fund and Franklin Templeton Investment Funds – Franklin Biotechnology Discovery Fund (together with their Affiliates, "Franklin"), Agent Capital Fund I LP (together with its Affiliates, "Agent Capital"), Vivo Panda Fund, L.P. (together with its Affiliates, "Vivo Panda"), Brace and F-Prime (collectively with AP, venBio, Osage, DUMAC, RA Capital, Franklin, Agent Capital, Vivo Panda and Brace, the "Investments Funds") is a professional investment fund, and as such invests in numerous portfolio companies, some of which may be deemed competitive with the Company's business (as currently conducted or as currently propose to be conducted) and (B) that Gilead is a public company with numerous business lines and an active investment and acquisition program (together, the "Other Gilead Business"). The Company hereby agrees that, to the extent permitted under applicable law, none of the Investment Funds nor Gilead or any of its Affiliates (together, the "Gilead Group") shall be liable to the Company for any claim arising out of, or based upon, (i) the investment by any Investment Fund or the Gilead Group in any entity competitive with the Company, (ii) actions taken by any partner, officer or other representative of any Investment Fund the Gilead Group to assist any such competitive company,

whether or not such action was taken as a member of the board of directors of such competitive company or otherwise, and whether or not such action has a detrimental effect on the Company or (iii) with respect to the Gilead Group, the Gilead Group engaging in Other Gilead Business; provided, however, that the foregoing shall not relieve (x) any of the Investors from liability associated with the unauthorized disclosure by the Investors (or any of their affiliates) of the Company's confidential information obtained pursuant to this Agreement, or (y) any director or officer of the Company from any liability associated with his or her fiduciary duties to the Company.

3.17 Termination of Certain Covenants. The covenants set forth in Sections 3.7, 3.8, 3.12, 3.13, 3.14, shall terminate and be of no further force or effect upon the consummation of (a) a Qualified IPO or (ii) a Liquidation Event, as that term is defined in the Restated Certificate.

4. Miscellaneous.

4.1 Successors and Assigns. Except as otherwise provided herein, the terms and conditions of this Agreement shall inure to the benefit of and be binding upon the respective successors and assigns of the parties (including transferees of any shares of Registrable Securities). Nothing in this Agreement, express or implied, is intended to confer upon any party other than the parties hereto or their respective successors and assigns any rights, remedies, obligations or liabilities under or by reason of this Agreement, except as expressly provided in this Agreement.

4.2 Governing Law. This Agreement shall be interpreted under the laws of the State of Delaware without reference to Delaware conflicts of law provisions.

4.3 Counterparts; Facsimile. This Agreement may be executed in two (2) or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Counterparts may be delivered via facsimile, electronic mail (including pdf or any electronic signature complying with the U.S. federal ESIGN Act of 2000, *e.g.*, www.docusign.com) or other transmission method and any counterpart so delivered shall be deemed to have been duly and validly delivered and be valid and effective for all purposes.

4.4 Titles and Subtitles. The titles and subtitles used in this Agreement are used for convenience only and are not to be considered in construing or interpreting this Agreement.

4.5 Notices. All notices and other communications given or made pursuant hereto shall be in writing and shall be deemed effectively given: (a) upon personal delivery to the party to be notified, (b) when sent by confirmed electronic mail or facsimile if sent during normal business hours of the recipient; if not, then on the next business day, (c) five (5) days after having been sent by registered or certified mail, return receipt requested, postage prepaid, or (d) one (1) day after deposit with a nationally recognized overnight courier, specifying next day delivery, with written verification of receipt. All notices and other communications shall be sent to the Company and to the other parties at the addresses set forth on the signature pages

hereto (or at such other addresses as shall be specified by notice given in accordance with this Section 4.5). If notice is given to the Company, a copy (which shall not constitute notice) shall also be sent to Smith, Anderson, Blount, Dorsett, Mitchell & Jernigan, L.L.P., Wells Fargo Capitol Center, 150 Fayetteville St., Suite 2300, Raleigh, NC 27601, Attention: Michael P. Saber, Facsimile No. (919) 821-6800; and if notice is given to the Investors, a copy (which shall not constitute notice) shall also be given to Tannenbaum Helpern Syracuse & Hirschtritt LLP, 900 Third Avenue, New York, NY 10022, Attention: James Rieger, Facsimile No. (212) 371-1084.

4.6 Entire Agreement; Amendments and Waivers. This Agreement (including the Exhibits hereto, if any) constitutes the full and entire understanding and agreement among the parties with regard to the subjects hereof and thereof, and supersedes all other agreements between or among any of the parties with respect to the subject matter hereof and thereof, including the Prior Agreement. Any term of this Agreement (other than Section 3.1, Section 3.2, Section 3.3, Section 3.4 and Section 3.16) may be amended and the observance of any term of this Agreement may be waived (either generally or in a particular instance and either retroactively or prospectively) only with the written consent of (a) the Company and (b) the Required Holders. The provisions of Section 3.1 and Section 3.2 may be amended or waived (either generally or in a particular instance and either retroactively or prospectively) only with the written consent of the Company and the Major Investors holding at least sixty percent (60%) of the Registrable Securities then held by all of the Major Investors. The provisions of Section 2.10, Section 3.4, Section 3.15 and Section 3.16 may be amended or waived only with the written consent of (a) the Company and (b) if such amendment or waiver adversely affects venBio, AP, Brace, F-Prime, Franklin, Osage, DUMAC, RA Capital, Agent Capital, Vivo Panda and/or Gilead, such adversely affected party. The provisions of Section 3.3 may be amended or waived only with the written consent of the Company and, if such amendment or waiver adversely affects F-Prime, Cowen and/or Brace, such adversely affected party. Notwithstanding the foregoing, this Agreement may not be amended, modified or terminated and the observance of any term hereof may not be waived with respect to any Investor without the written consent of such Investor, unless such amendment, modification, termination, or waiver applies to all Investors in the same fashion (it being agreed that a waiver of the provisions of Section 3.5 (Right of First Offer) with respect to a particular transaction shall be deemed to apply to all Investors in the same fashion if such waiver does so by its terms, notwithstanding the fact that certain Investors may nonetheless, by agreement with the Company, purchase securities in such transaction). Further, this Agreement may not be amended, and no provision hereof may be waived, in each case, in any way which would adversely affect the rights of the Common Holders hereunder in a manner disproportionate to any adverse effect such amendment or waiver would have on the rights of the Investors hereunder, without also obtaining the written consent of the Common Holders holding a majority of the shares of Common Stock then held by all Common Holders who are then providing services to the Company as officers or employees in good standing. Any amendment or waiver effected in accordance with this paragraph shall be binding upon each holder of any Registrable Securities, each future holder of all such Registrable Securities and the Company.

4.7 Waiver of Rights of First Offer. Pursuant to Sections 3.5 and 4.6 of the Prior Agreement, the Investors having rights of first offer under the Prior Agreement hereby waive, on behalf of all parties having such rights thereunder, all rights they may have under

Section 3.5 of the Prior Agreement with respect to the issuance and sale of the Series B Stock pursuant to the Purchase Agreement and the Common Stock issuable to the purchasers of the Series B Stock pursuant to the Purchase Agreement, including, without limitation, their right to receive notice pursuant to Section 3.5(a) of the Prior Agreement and their right of first offer pursuant to Section 3.5 of the Prior Agreement.

4.8 Severability. Whenever possible, each provision of this Agreement shall be interpreted in such manner as to be effective and valid under applicable law, but if any provision of this Agreement shall be held to be prohibited by or invalid under applicable law, such provision shall be ineffective only to the extent of such prohibition or invalidity, without invalidating the remainder of such provision or the remaining provisions of this Agreement.

4.9 Aggregation of Stock. All shares of Registrable Securities held or acquired by affiliated entities (including affiliated venture capital, hedge and private equity style funds or venture capital, hedge or private equity style funds under common investment management) or Persons shall be aggregated together for the purpose of determining the availability of any rights under this Agreement.

4.10 Additional Investors. Notwithstanding Section 4.6, no consent shall be necessary to add additional Investors as signatories to this Agreement and to update Schedule A accordingly, provided that such Investors have purchased Series B Stock pursuant to the subsequent closing provisions of Section 1.3 of the Purchase Agreement. Schedule A shall be updated without any action of the Investors to reflect such additional Investors.

4.11 WAIVER OF JURY TRIAL. EACH PARTY HEREBY WAIVES ITS RIGHTS TO A JURY TRIAL OF ANY CLAIM OR CAUSE OF ACTION BASED UPON OR ARISING OUT OF THIS AGREEMENT, THE OTHER AGREEMENTS TO BE EXECUTED IN CONNECTION WITH THE EXECUTION OF THIS AGREEMENT, THE REGISTRABLE SECURITIES OR THE SUBJECT MATTER HEREOF OR THEREOF. THE SCOPE OF THIS WAIVER IS INTENDED TO BE ALL-ENCOMPASSING OF ANY AND ALL DISPUTES THAT MAY BE FILED IN ANY COURT AND THAT RELATE TO THE SUBJECT MATTER OF THE TRANSACTIONS CONTEMPLATED HEREBY, INCLUDING, WITHOUT LIMITATION, CONTRACT CLAIMS, TORT CLAIMS (INCLUDING NEGLIGENCE), BREACH OF DUTY CLAIMS, AND ALL OTHER COMMON LAW AND STATUTORY CLAIMS. THIS SECTION HAS BEEN FULLY DISCUSSED BY EACH OF THE PARTIES HERETO AND THESE PROVISIONS WILL NOT BE SUBJECT TO ANY EXCEPTIONS. EACH PARTY HERETO HEREBY FURTHER WARRANTS AND REPRESENTS THAT SUCH PARTY HAS REVIEWED THIS WAIVER WITH ITS LEGAL COUNSEL, AND THAT SUCH PARTY KNOWINGLY AND VOLUNTARILY WAIVES ITS JURY TRIAL RIGHTS FOLLOWING CONSULTATION WITH LEGAL COUNSEL.

[*Remainder of page intentionally left blank*]

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

COMPANY:

PRECISION BIOSCIENCES, INC.

By: /s/ Matthew Kane
Name: Matthew Kane
Title: President and Chief Executive Officer

Address:
302 E. Pettigrew Street, Suite A-100
Durham, NC 27701

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

COMMON HOLDERS:

DEREK JANTZ

/s/ Derek Jantz
Derek Jantz

MATTHEW KANE

/s/ Matthew Kane
Matthew Kane

JEFF SMITH

/s/ Jeff Smith
Jeff Smith

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

ADAGE CAPITAL PARTNERS, LP

By: Adage Capital Partners, GP, LLC
Its: General Partner

By: Adage Capital Advisors, LLC
Its: Managing Member

By: /s/ Dan Lehan
Name: Dan Lehan
Title: COO

Address:
200 Clarendon Street
52nd
Boston, MA 02116

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

AGENT CAPITAL FUND I LP

By: Agent Capital Fund I GP, LLC
Its: General Partner

By: /s/ Geeta Vemuri
Name: Geeta Vemuri
Title: Managing Member

Address:
810 Memorial Drive, Suite 107
Cambridge, MA-02139

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

ALEXANDRIA VENTURE INVESTMENTS, LLC

By: Alexandria Real Estate Equities, Inc.
Its: Managing Member

By: /s/ Aaron Jacobson
Name: Aaron Jacobson
Title: SVP – Venture Counsel

Address:
385 E. Colorado Blvd., Suite 299
Pasadena, CA 91101

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

AMGEN VENTURES, LLC

By: /s/ David A. Piacquad
Name: David A. Piacquad
Title: SVP, Business Development

Address:
c/o Amgen Inc.
One Amgen Center Drive
Thousand Oaks, CA 91320
Attn: Corporate Secretary

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

MERIDIAN GROWTH FUND

By: ArrowMark Colorado Holdings, LLC
Its: Investment Adviser

By: /s/ David Corkins
Name: David Corkins
Title: Managing Member

Address:
ArrowMark Partners
100 Fillmore Street, Suite 325
Denver, CO 80206

MERIDIAN SMALL CAP GROWTH FUND

By: ArrowMark Colorado Holdings, LLC
Its: Investment Adviser

By: /s/ David Corkins
Name: David Corkins
Title: Managing Member

Address:
ArrowMark Partners
100 Fillmore Street, Suite 325
Denver, CO 80206

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

ARROWMARK LIFE SCIENCE FUND, LP

By: AMP Life Science GP, LLC
Its: General Partner

By: /s/ David Corkins
Name: David Corkins
Title: Managing Member

Address:
ArrowMark Partners
100 Fillmore Street, Suite 325
Denver, CO 80206

ARROWMARK FUNDAMENTAL OPPORTUNITY FUND, L.P.

By: ArrowMark Partners GP, LLC
Its: General Partner

By: /s/ David Corkins
Name: David Corkins
Title: Managing Member

Address:
ArrowMark Partners
100 Fillmore Street, Suite 325
Denver, CO 80206

LOOKFAR INVESTMENTS, LLC

By: /s/ David Corkins
Name: David Corkins
Title: Managing Member

Address:
ArrowMark Partners
100 Fillmore Street, Suite 325
Denver, CO 80206

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

CF ASCENT LLC

By: /s/ David Corkins
Name: David Corkins
Title: Managing Member

Address:
ArrowMark Partners
100 Fillmore Street, Suite 325
Denver, CO 80206

THB IRON ROSE, LLC

By: ArrowMark Colorado Holdings, LLC
Its: Investment Adviser

By: /s/ David Corkins
Name: David Corkins
Title: Managing Member

Address:
ArrowMark Partners
100 Fillmore Street, Suite 325
Denver, CO 80206

THB IRON ROSE, LLC LIFE SCIENCE PORTFOLIO

By: ArrowMark Colorado Holdings, LLC
Its: Investment Adviser

By: /s/ David Corkins
Name: David Corkins
Title: Managing Member

Address:
ArrowMark Partners
100 Fillmore Street, Suite 325
Denver, CO 80206

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

IRON HORSE INVESTMENTS, LLC

By: ArrowMark Colorado Holdings, LLC
Its: Investment Adviser

By: /s/ David Corkins
Name: David Corkins
Title: Managing Member

Address:
ArrowMark Partners
100 Fillmore Street, Suite 325
Denver, CO 80206

/s/ Tony Yao
Tony Yao

Address:
ArrowMark Partners
100 Fillmore Street, Suite 325
Denver, CO 80206

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

BRACE PHARMACEUTICALS LLC

By: /s/ Vinzenz Ploerer
Name: Vinzenz Ploerer
Title: President and CEO

Address:
155 Gibbs Street, Suite 406
Rockville, MD 20850

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

CORMORANT PRIVATE HEALTHCARE FUND I, LP

By: Cormorant Private Healthcare GP, LLC
Its: General Partner

By: /s/ Bihua Chen
Name: Bihua Chen
Title: Managing Member

Address:
200 Clarendon Street, 5nd Floor
Boston, MA 02116

CORMORANT GLOBAL HEALTHCARE MASTER FUND, LP

By: Cormorant Global Healthcare GP, LLC
Its: General Partner

By: /s/ Bihua Chen
Name: Bihua Chen
Title: Managing Member

Address:
200 Clarendon Street, 5nd Floor
Boston, MA 02116

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

CRMA SPV, L.P.

By: Cormorant Asset Management, LP
Its: Attorney-in-Fact

By: /s/ Bihua Chen
Name: Bihua Chen
Title: CEO/CIO

Address:
P.O. Box 309
Ugland House
Grand Cayman
KY1-1104 Cayman Islands

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

COWEN HEALTHCARE INVESTMENTS II LP

By: Cowen Healthcare Investments II GP LLC
Its: General Partner

By: /s/ Kevin Raidy
Name: Kevin Raidy
Title: Managing Partner

Address:
c/o Cowen Advisors, LLC
599 Lexington Avenue, 19th Floor
New York, NY 10022
Attention: Kevin Raidy

CHI EF II LP

By: Cowen Healthcare Investments II GP LLC
Its: General Partner

By: /s/ Kevin Raidy
Name: Kevin Raidy
Title: Managing Partner

Address:
c/o Cowen Advisors, LLC
599 Lexington Avenue, 19th Floor
New York, NY 10022
Attention: Kevin Raidy

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

G LTP LLC

By: /s/ Seth M. Posternak
Name: Seth M. Posternak
Title: Investment Manager
DUMAC, Inc. Authorized Agent

By: /s/ Jannine M. Lall
Name: Jannine M. Lall
Title: Controller
DUMAC, Inc. Authorized Agent

Address:
280 S. Mangum Street, Suite 210
Durham, NC 27701-3675

G HSP LLC

By: /s/ Seth M. Posternak
Name: Seth M. Posternak
Title: Investment Manager
DUMAC, Inc. Authorized Agent

By: /s/ Jannine M. Lall
Name: Jannine M. Lall
Title: Controller
DUMAC, Inc. Authorized Agent

Address:
280 S. Mangum Street, Suite 210
Durham, NC 27701-3675

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

G JBD LLC

By: /s/ Seth M. Posternak
Name: Seth M. Posternak
Title: Investment Manager
DUMAC, Inc. Authorized Agent

By: /s/ Jannine M. Lall
Name: Jannine M. Lall
Title: Controller
DUMAC, Inc. Authorized Agent

Address:
280 S. Mangum Street, Suite 210
Durham, NC 27701-3675

G ERP LLC

G ERP LLC, acting through the Duke University Defined Benefit Plan Master Trust
By: DUMAC, Inc., as authorized agent of the trustee of the master trust

By: /s/ Seth M. Posternak
Name: Seth M. Posternak
Title: Investment Manager
DUMAC, Inc. Authorized Agent

By: /s/ Jannine M. Lall
Name: Jannine M. Lall
Title: Controller
DUMAC, Inc. Authorized Agent

Address:
280 S. Mangum Street, Suite 210
Durham, NC 27701-3675

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

F-PRIME CAPITAL PARTNERS HEALTHCARE FUND IV LP

By: F-Prime Capital Partners Healthcare Advisors Fund IV LP
Its: General Partner

By: Impresa Holdings LLC
Its: General Partner

By: Impresa Management LLC
Its: Managing Member

By: /s/ Mary Bevelock Pendergast
Name: Mary Bevelock Pendergast
Title: Vice President

Address:
c/o F-Prime Capital
1 Main Street, 13th Floor
Cambridge, MA 02142

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

FRANKLIN TEMPLETON INVESTMENT FUNDS – FRANKLIN BIOTECHNOLOGY DISCOVERY FUND

By: Franklin Advisers, Inc.
Its: Investment Manager

By: /s/ Evan McCulloch
Name: Evan McCulloch
Title: Vice President

Address:
Franklin Templeton
Attn: Wendy Lam
One Franklin Parkway
San Mateo, CA 94403

FRANKLIN STRATEGIC SERIES – FRANKLIN BIOTECHNOLOGY DISCOVERY FUND

By: Franklin Advisers, Inc.
Its: Investment Manager

By: /s/ Evan McCulloch
Name: Evan McCulloch
Title: Vice President

Address:
Franklin Templeton
Attn: Wendy Lam
One Franklin Parkway
San Mateo, CA 94403

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

GILEAD SCIENCES, INC.

By: /s/ Robin L. Washington
Name: Robin L. Washington
Title: EVP, Chief Financial Officer

Address:
333 Lakeside Drive
Foster City, CA 94404
Attn: Andrew Dickinson, SVP, Corporate Dev.

With copy to:

Address:
Gilead Sciences, Inc.
333 Lakeside Drive
Foster City, CA 94404
Attn: General Counsel

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

LEERINK HOLDINGS LLC

By: /s/ Timothy A. G. Gerhold
Name: Timothy A. G. Gerhold
Title: General Counsel

Address:
One Federal Street, 37th Floor
Boston, MA 02110
Attn: General Counsel

LEERINK PARTNERS CO-INVESTMENT FUND, LLC

By: /s/ Jeffrey A. Leerink
Name: Jeffrey A. Leerink
Title: Manager

Address:
One Federal Street, 37th Floor
Boston, MA 02110
Attn: General Counsel

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

LONGEVITY FUND 1 LP

By: Longevity Funds LLC
Its: General Partner

By: /s/ Laura H. Deming
Name: Laura Deming
Title: Partner

Address:
555 Bryant St, Palo Alto CA 94301

LONGEVITY FUND 2 LP

By: Longevity Funds 2 LLC
Its: General Partner

By: /s/ Laura H. Deming
Name: Laura Deming
Title: Partner

Address:
555 Bryant St, Palo Alto CA 94301

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

/s/ Robert Millman
Robert Millman

Address:
404 Beacon Street, #4
Boston, MA 02115

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

OCV FUND I, L.P.

By: OCV I GP, LLC
Its: General Partner

By: /s/ Mark Yung
Name: Mark Yung
Title: M Principal

Address:
4700 Wilshire Blvd.
Los Angeles, CA 90010
Attn: Mark Yung

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

OSAGE UNIVERSITY PARTNERS II, LP

By: Osage University GP II, LLC
Its: General Partner

By: /s/ William Harrington
Name: William Harrington
Title: Member

Address:
50 Monument Road, Suite 201
Bala Cynwyd, PA 19004

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

PONTIFAX GLOBAL FOOD AND AGRICULTURE TECHNOLOGY FUND, L.P.

By: Pontifax Global Food and Agriculture Technology GP LLC
Its: General Partner

By: Adrenalin Properties Limited
Its: Managing Member

By: /s/ Ben Belldegrun
Name: Ben Belldegrun
Title: Managing Member

Address:
2025 S. Westgate Avenue, First Floor
Los Angeles, CA 90025

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

RA CAPITAL HEALTHCARE FUND, L.P.

By: RA Capital Management, LLC
Its: General Partner

By: /s/ Rajeev Shah
Name: Rajeev Shah
Title: Authorized Signatory

Address:
20 Park Plaza, Suite 1200
Boston, MA 02116
Attn: Compliance

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

REV CAPITAL II, LLC

By: /s/ Eric I. Richman
Name: Eric I. Richman
Title:

Address:
9740 Sorrel Avenue
Potomac, MD 20854

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

RFS PARTNERS, LP

By: RFS & Associates, LLC
Its: General Partner

By: /s/ Raymond F. Schinazi
Name: Raymond F. Schinazi
Title: Manager

Address:
1860 Montreal Road
Tucker, GA 30084
Attn: Bill Ollinger

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

RIDGEBACK CAPITAL INVESTMENTS LP

By: Ridgeback Capital Management LP
Its: Investment Manager

By: /s/ Christopher A. Nonas
Name: Christopher A. Nonas
Title: Chief Financial Officer

Address:
Ridgeback Capital Management LP
75 Ninth Ave., 5th Floor
New York, NY 10011

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

TODDMAN PTY LTD (ATF MH JORGENSEN FAMILY TRUST)

By: /s/ Max Jorgensen
Name: Max Jorgensen
Title:

Address:
Unit 1411/22 Refinery Parade
New Farm, Queensland 4005
Australia
Attn: Todd Jorgensen

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

VENBIO GLOBAL STRATEGIC FUND, L.P.

By: venBio Global Strategic GP, L.P.
Its: General Partner

By: venBio Global Strategic GP, Ltd.
Its: General Partner

By: /s/ Robert Adelman
Name: Robert Adelman
Title: Director

Address:
venBio Partners LLC
1700 Owens Street, Suite 595
San Francisco, CA 94158

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

INVESTOR:

VIVO PANDA FUND, L.P.

By: Vivo Panda, LLC
Its: General Partner

By: /s/ Mahendra Shah
Name: Mahendra Shah
Title: Managing Member

Address:
505 Hamilton Avenue, Suite 207
Palo Alto, CA 94301

SCHEDULE A

SCHEDULE OF INVESTORS

Name and Address	Number of Series A Shares Purchased	Number of Series B Shares Purchased
Adage Capital Partners, LP 200 Clarendon Street, 52nd Floor Boston, MA 02116 [***] [***] [***]	0	1,497,006
Agent Capital Fund I LP 810 Memorial Drive, Suite 107 Cambridge, MA 02139 [***] [***]	0	399,202
Alexandria Venture Investments, LLC 385 E. Colorado Blvd., Suite 299 Pasadena, CA 91101 [***] [***]	0	598,803
Amgen Investments Ltd. c/o Amgen Inc. One Amgen Center Drive Thousand Oaks, CA 91320 Attn: Corporate Secretary [***] [***] [***]	3,000,000	0
Amgen Ventures LLC c/o Amgen Inc. One Amgen Center Drive Thousand Oaks, CA 91320 Attn: Corporate Secretary [***] [***] [***]	0	499,002
ArrowMark Fundamental Opportunity Fund, L.P. ArrowMark Partners 100 Fillmore Street, Suite 325 Denver, CO 80206 [***] [***] [***] [***]	0	200,000

Name and Address	Number of Series A Shares Purchased	Number of Series B Shares Purchased
ArrowMark Life Science Fund ArrowMark Partners 100 Fillmore Street, Suite 325 Denver, CO 80206 [***] [***] [***] [***]	0	244,572
Baxalta US Inc. One Baxter Parkway Deerfield, IL 60015	2,000,000	0
Brace Pharmaceuticals LLC 155 Gibbs Street, Suite 406 Rockville, MD 20850 [***] [***] [***]	0	1,996,008
CF Ascent LLC ArrowMark Partners 100 Fillmore Street, Suite 325 Denver, CO 80206 [***] [***] [***] [***]	0	10,000
CHI EF II LP c/o Cowen Advisors, LLC 599 Lexington Avenue, 19th Floor New York, NY 10022 Attention: Tim Anderson [***]	0	135,805
Cormorant Global Healthcare Master Fund, LP 200 Clarendon Street, 5nd Floor Boston, MA 02116 [***] [***]	0	223,653
Cormorant Private Healthcare Fund I, LP 200 Clarendon Street, 5nd Floor Boston, MA 02116 [***] [***]	0	739,720

Name and Address	Number of Series A Shares Purchased	Number of Series B Shares Purchased
Cowen Healthcare Investment II LP c/o Cowen Advisors, LLC 599 Lexington Avenue, 19th Floor New York, NY 10022 Attention: Tim Anderson [***]	0	1,860,203
CRMA SPV, L.P. P.O. Box 309 Ugland House Grand Cayman KY1-11004 Cayman Islands [***] [***]	0	34,631
F-Prime Capital Partners Healthcare Fund IV LP c/o Fidelity Biosciences 1 Main Street, 13th Floor Cambridge, MA 02142 Attn: Mary Bevelock Pendergast [***] [***] [***] [***] [***]	7,000,000	873,253
Franklin Strategic Series – Franklin Biotechnology Discovery Fund Attention: Wendy Lam One Franklin Parkway San Mateo, CA 94403 [***] [***] [***]	0	750,193
Franklin Templeton Investment Funds – Franklin Biotechnology Discovery Fund Attention: Wendy Lam One Franklin Parkway San Mateo, CA 94403 [***] [***] [***]	0	1,245,815

Name and Address	Number of Series A Shares Purchased	Number of Series B Shares Purchased
G ERP LLC c/o DUMAC, Inc. 280 South Mangum Street, Suite 210 Durham, NC 27701-3675 [***] [***] [***] [***] [***]	45,995	15,607
G HSP LLC c/o DUMAC, Inc. 280 South Mangum Street, Suite 210 Durham, NC 27701-3675 [***] [***] [***] [***] [***]	61,493	20,866
G JBD LLC c/o DUMAC, Inc. 280 South Mangum Street, Suite 210 Durham, NC 27701-3675 [***] [***] [***] [***] [***]	105,507	35,801
G LTP LLC c/o DUMAC, Inc. 280 South Mangum Street, Suite 210 Durham, NC 27701-3675 [***] [***] [***] [***] [***]	287,005	97,387
Gilead Sciences, Inc. 333 Lakeside Drive Foster City, CA 94404 Attn: Andrew Dickinson, SVP, Corporate Dev. With copy to: Gilead Sciences, Inc. 333 Lakeside Drive Foster City, CA 94404 Attn: General Counsel [***] [***] [***] [***]	0	998,004

Name and Address	Number of Series A Shares Purchased	Number of Series B Shares Purchased
Iron Horse Investments, LLC ArrowMark Partners 100 Fillmore Street, Suite 325 Denver, CO 80206 [***] [***] [***] [***]	0	149,451
Leerink Holdings LLC One Federal Street, 37th Floor Boston, MA 02110 Attn: General Counsel [***] [***] [***] [***] [***] [***]	0	149,701
Leerink Partners Co-Investment Fund, LLC One Federal Street, 37th Floor Boston, MA 02110 Attn: General Counsel [***] [***] [***] [***] [***] [***]	0	149,701
Longevity Fund 1 LP 555 Bryant Street, #517 Palo Alto, CA 94301 Attn: Laura Deming [***]	150,000	49,900
Longevity Fund 2 LP 555 Bryant Street, #517 Palo Alto, CA 94301 Attn: Laura Deming [***]	0	49,900
Lookfar Investments, LLC ArrowMark Partners 100 Fillmore Street, Suite 325 Denver, CO 80206 [***] [***] [***] [***]	0	39,920

Name and Address	Number of Series A Shares Purchased	Number of Series B Shares Purchased
Meridian Growth Fund ArrowMark Partners 100 Fillmore Street, Suite 325 Denver, CO 80206 [***] [***] [***] [***]	0	624,759
Meridian Small Cap Growth Fund ArrowMark Partners 100 Fillmore Street, Suite 325 Denver, CO 80206 [***] [***] [***] [***]	0	558,855
Robert Millman 404 Beacon Street, #4 Boston, MA 02115 [***]	0	49,900
OCV Fund I, L.P. 4700 Wilshire Blvd. Los Angeles, CA 90010 Attn: Mark Yung [***] [***] [***]	0	2,360,289
Osage University Partners II, LP 50 Monument Road, Suite 201 Bala Cynwyd, PA 19004 [***] [***] [***]	2,000,000	399,202
Pontifax Global Food and Agriculture Technology Fund, L.P. 2025 S. Westgate Avenue, First Floor Los Angeles, CA 90025 Attn: Ben Belldegrun [***] [***] [***]	0	1,996,008
RA Capital Healthcare Fund, L.P. c/o RA Capital Management, LLC 20 Park Plaza, Suite 1200 Boston, MA 02116 Attn: Compliance [***] [***] [***]	3,000,000	399,202

Name and Address	Number of Series A Shares Purchased	Number of Series B Shares Purchased
REV Capital II, LLC Attn: Erick I. Richman 9740 Sorrel Avenue Potomac, MD 20854 [***]	0	99,800
RFS Partners, LP Attn: Bill Ollinger 1860 Montreal Road Tucker, GA 30084 [***] [***]	0	119,761
Ridgeback Capital Investments LP Attn: Ridgeback Capital Management LP 75 Ninth Avenue, 5th Floor New York, NY 10011 [***]	0	499,002
THB Iron Rose, LLC Life Science Portfolio ArrowMark Partners 100 Fillmore Street, Suite 325 Denver, CO 80206 [***] [***] [***] [***]	0	9,500
THB Iron Rose, LLC ArrowMark Partners 100 Fillmore Street, Suite 325 Denver, CO 80206 [***] [***] [***] [***]	0	149,451
Toddman Pty Ltd (ATF MH Jorgensen Family Trust) Unit 1411/22 Refinery Parade New Farm, Queensland 4005 Australia Attn: Todd Jorgensen [***]	0	19,955
venBio Global Strategic Fund L.P. venBio Partners LLC 1700 Owens Street, Suite 595 San Francisco, CA 94158 Attn: Robert Adelman [***] [***]	8,000,000	998,004

Name and Address	Number of Series A Shares Purchased	Number of Series B Shares Purchased
Vivo Panda Fund, L.P. Vivo Capital 505 Hamilton Avenue, Suite 207 Palo Alto, CA 94301 [***] [***] [***]	0	598,803
Tony Yao ArrowMark Partners 100 Fillmore Street, Suite 325 Denver, CO 80206 [***]	0	9,500
TOTAL	**25,650,000**	**21,956,095**

SCHEDULE B

SCHEDULE OF COMMON HOLDERS

Name	Shares of Common Stock	Options
Derek Jantz	8,208,231	738,888
Matthew Kane	3,847,616	738,888
Jeff Smith	8,208,231	738,888

PRECISION BIOSCIENCES, INC.
AMENDMENT AND JOINDER TO AMENDED AND RESTATED INVESTORS' RIGHTS AGREEMENT

THIS AMENDMENT AND JOINDER TO INVESTORS' RIGHTS AGREEMENT (this "**Agreement**") is entered into this 1st day of March, 2019, by and among Precision BioSciences, Inc., a Delaware corporation (the "**Company**"), the undersigned holders of the Company's capital stock (the "**Existing Investors**"), and the undersigned holders of the Notes (as defined below) issued by the Company (the "**Noteholders**" and together with the Existing Investors, the "**Investors**").

RECITALS

WHEREAS, the Company, the Existing Investors and certain holders of the Company's Common Stock, par value $0.000005 per share (the "**Common Stock**"), have previously entered into that certain Amended and Restated Investors' Rights Agreement dated as of May 25, 2018 by and among the Company and the parties thereto (the "**Rights Agreement**");

WHEREAS, on the date hereof the Company is issuing and selling to the Noteholders convertible promissory notes (the "**Notes**") pursuant to that certain Convertible Note Purchase Agreement (the "**Note Purchase Agreement**") dated as of even date herewith by and among the Company and the Noteholders (the "**Financing**");

WHEREAS, Section 4.6 of the Rights Agreement provides that the Rights Agreement generally may be amended with the written consent of (i) the Company and (ii) the holders of at least sixty percent (60%) of the Registrable Securities (as defined in the Rights Agreement) issued or issuable upon conversion of the Company's Preferred Stock (as defined in the Rights Agreement) voting together as a single class and on an as-converted basis;

WHEREAS, the Existing Investors whose signatures appear on the signature pages attached hereto constitute the required holders under the Rights Agreement necessary to amend the Rights Agreement;

WHEREAS, it is a condition to the Financing that the Company amend the Rights Agreement and that the Noteholders join and become a party to the Rights Agreement, as hereby amended, such that the shares of the Company's Common Stock issuable upon conversion of the Notes upon a Qualified Public Offering or Public Offering (each as defined in the Notes) shall be considered Registrable Securities under Section 2 of the Rights Agreement;

WHEREAS, the Company and the Investors desire to enter into this Agreement to amend the Rights Agreement on the terms and conditions set forth in this Agreement and to acknowledge and agree that the Noteholders shall be joined as a party to the Rights Agreement, as hereby amended;

NOW, THEREFORE, in consideration of the premises and the mutual covenants contained in this Agreement the parties hereto agree as follows:

1. Acknowledgement. Each of the Noteholders acknowledges that they are acquiring the Notes pursuant to the Note Purchase Agreement. Each of the Noteholders acknowledges that it has received a copy of the Rights Agreement and has had the opportunity to review the terms thereof.

2. Joinder. Each of the Noteholders hereby (a) joins as a party to and agrees to be bound by the terms and conditions of the Rights Agreement, as hereby amended, as a Holder (as defined in the Rights Agreement) of Registrable Securities thereunder; and (b) agrees that the shares of Common Stock issuable upon conversion of the Notes upon a Qualified Public Offering or Public Offering to each Noteholder, and any other shares of capital stock or securities required by the Rights Agreement, as hereby amended, to be bound thereby, shall be bound by and subject to the terms of the Rights Agreement, as hereby amended. Each of the Company and the Existing Investors hereby consents to the addition of each Noteholder as a party to the Rights Agreement, as hereby amended, as a Holder of Registrable Securities.

3. Effectiveness. This Agreement shall become effective upon the date of the closing of the sale of the Notes pursuant to the Note Purchase Agreement.

4. Amendment of Rights Agreement.

a. The following new definition of "Note" shall be added as clause (l) of Section 1 of the Rights Agreement:

"(l) "Note" means those certain convertible promissory notes issued by the Company pursuant to the Note Purchase Agreement."

b. The following new definition of "Note Purchase Agreement" shall be added as clause (m) of Section 1 of the Rights Agreement:

"(g) Note Purchase Agreement" means that certain Convertible Note Purchase Agreement dated as of March 1, 2019 by and among the Company and the Purchasers named therein.

c. The definition of "Preferred Stock" in clause (n) of Section 1 of the Rights Agreement is hereby deleted in its entirety and replaced with the following new definition:

"Preferred Stock" shall mean the Series A Stock, the Series B Stock, and the shares of preferred stock of the Company issuable upon conversion of the Notes pursuant to the terms thereof.

d. The definition of "Registrable Securities" in clause (p) of Section 1 of the Rights Agreement is hereby deleted in its entirety and replaced with the following new definition:

"Registrable Securities" means (i) the Common Stock issuable or issued upon conversion of the Preferred Stock and the Notes, and any Common Stock issued as (or issuable upon conversion or exercise of any warrant, right or other security which is issued as) a dividend or other distribution with respect to, in exchange for or in replacement of such Preferred Stock, and (ii) the Common Holder

Registrable Securities, provided, however, that such Common Holder Registrable Securities shall not be deemed Registrable Securities and the Common Holders shall not be deemed Holders for the purposes of Sections 2.1, 2.11 and 4.6 and any Common Stock of the Company issued as (or issuable upon the conversion or exercise of any warrant, right or other security that is issued as) a dividend or other distribution with respect to, or in exchange for, or in replacement of, the shares referenced in (i) and (ii) above, excluding in all cases, however, any Registrable Securities sold by a Person in a transaction in which such Person's rights under Section 2 of this Agreement are not assigned. In addition, the number of shares of Registrable Securities outstanding shall equal the aggregate of the number of shares of Common Stock outstanding that are, and the number of shares of Common Stock issuable pursuant to then exercisable or convertible securities that are, Registrable Securities, provided, however, that neither the shares of Common Stock issuable upon conversion of the Notes nor the Registrable Securities issuable upon conversion of the Notes shall be included in the number of Registrable Securities outstanding until such time as the Notes have converted into Registrable Securities.

e. The definition of "Required Holders" in clause (q) of Section 1 of the Rights Agreement is hereby deleted in its entirety and replaced with the following new definition:

"Required Holders" shall mean the written consent or affirmative vote of the holders of at least sixty percent (60%) of the Registrable Securities issued or issuable upon conversion of the Preferred Stock and the Notes, given in writing or by vote at a meeting, consenting or voting (as the case may be) together as a single class on an as-converted basis, provided, however, that the Registrable Securities issuable upon conversion of the Notes shall not be included in the calculation of Required Holders until such time as the Notes have converted into Registrable Securities.

f. Section 2.2(a) of the Rights Agreement is hereby deleted in its entirety and replaced with the following new Section 2.2(a):

(a) If (but without any obligation to do so) the Company proposes to register (including for this purpose a registration effected by the Company for stockholders other than the Holders) any of its stock or other securities under the Act in connection with the public offering of such securities (other than (i) a registration relating to a request pursuant to Section 2.1 of this Agreement; (ii) a registration relating to the Initial Offering, but only if the effective date of the Initial Offering occurs on or before June 30, 2019; or (iii) a registration relating solely to the sale of securities of participants in a Company employee benefit or stock ownership plan, a registration relating to a corporate reorganization or transaction under Rule 145 of the Act, a registration on any form that does not include substantially the same information as would be required to be included in a registration statement covering the sale of the Registrable Securities, or a registration in which the only Common Stock being registered is Common Stock issuable upon conversion of debt securities that are also being registered), the

Company shall, at such time, promptly give each Holder written notice of such registration. Upon the written request of each Holder given within twenty (20) days after mailing of such notice by the Company in accordance with Section 4.5 of this Agreement, the Company shall, subject to the provisions of Section 2.2(c) of this Agreement, use its best efforts to cause to be registered under the Act all of the Registrable Securities that each such Holder requests to be registered.

5. Effect of Amendment. Except as expressly set forth herein, no other terms or provisions of the Rights Agreement are amended or modified, and all such provisions and terms are hereby ratified and confirmed in all respects.

6. Governing Law. This Agreement shall be governed by and construed in accordance with the laws of the State of Delaware without reference to Delaware conflicts of law provisions.

7. Counterparts. This Agreement may be executed in two (2) or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Counterparts may be delivered via facsimile, electronic mail (including pdf or any electronic signature complying with the U.S. federal ESIGN Act of 2000, e.g., www.docusign.com) or other transmission method and any counterpart so delivered shall be deemed to have been duly and validly delivered and be valid and effective for all purposes.

[Signature pages follow]

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first written above.

COMPANY:

PRECISION BIOSCIENCES, INC.

By: /s/ Matthew Kane
Name: Matthew Kane
Title: President and Chief Executive Officer

Address: 302 E. Pettigrew Street
Suite A-100
Durham, NC 27701

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first written above.

INVESTORS

ADAGE CAPITAL PARTNERS, LP

By: Adage Capital Partners, GP, LLC
Its: General Partner

By: Adage Capital Advisors, LLC
Its: Managing Member

By: /s/ Dan Lehan
Name: Dan Lehan
Title: CEO

[Signature Page to Amendment to Investors' Rights Agreement]

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INVESTORS

AGENT CAPITAL FUND I LP

By: Agent Capital Fund I GP, LLC
Its: General Partner

By: /s/ Geeta Vemuri
Name: Geeta Vemuri
Title: Managing Partner

[Signature Page to Amendment to Investors' Rights Agreement]

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INVESTORS

ALEXANDRIA VENTURE INVESTMENTS, LLC

By: Alexandria Real Estate Equities, Inc.
Its: Managing Member

By: /s/ Aaron Jacobson
Name: Aaron Jacobson
Title: SVP – Venture Counsel

[Signature Page to Amendment to Investors' Rights Agreement]

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INVESTORS

MERIDIAN GROWTH FUND

By: ArrowMark Colorado Holdings, LLC
Its: Investment Adviser

By: /s/ David Corkins
Name: David Corkins
Title: Managing Member

MERIDIAN SMALL CAP GROWTH FUND

By: ArrowMark Colorado Holdings, LLC
Its: Investment Adviser

By: /s/ David Corkins
Name: David Corkins
Title: Managing Member

ARROWMARK LIFE SCIENCE FUND, LP

By: AMP Life Science GP, LLC
Its: General Partner

By: /s/ David Corkins
Name: David Corkins
Title: Managing Member

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INVESTORS

ARROWMARK FUNDAMENTAL OPPORTUNITY FUND, L.P.

By: ArrowMark Partners GP, LLC
Its: General Partner

By: /s/ David Corkins
Name: David Corkins
Title: Managing Member

LOOKFAR INVESTMENTS, LLC

By: /s/ David Corkins
Name: David Corkins
Title: Managing Member

CF ASCENT LLC

By: /s/ David Corkins
Name: David Corkins
Title: Managing Member

THB IRON ROSE, LLC

By: ArrowMark Colorado Holdings, LLC
Its: Investment Adviser

By: /s/ David Corkins
Name: David Corkins
Title: Managing Member

[Signature Page to Amendment to Investors' Rights Agreement]

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INVESTORS

THB IRON ROSE, LLC LIFE SCIENCE PORTFOLIO

By: ArrowMark Colorado Holdings, LLC
Its: Investment Adviser

By: /s/ David Corkins
Name: David Corkins
Title: Managing Member

IRON HORSE INVESTMENTS, LLC

By: ArrowMark Colorado Holdings, LLC
Its: Investment Adviser

By: /s/ David Corkins
Name: David Corkins
Title: Managing Member

/s/ Tony Yao
Tony Yao

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INVESTORS

CORMORANT PRIVATE HEALTHCARE FUND I, LP

By: Cormorant Private Healthcare GP, LLC
Its: General Partner

By: /s/ Bihua Chen
Name: Bihua Chen
Title: Managing Member of the GP

CORMORANT GLOBAL HEALTHCARE MASTER FUND, LP

By: Cormorant Global Healthcare GP, LLC
Its: General Partner

By: /s/ Bihua Chen
Name: Bihua Chen
Title: Managing Member of the GP

CRMA SPV, L.P.

By: Cormorant Asset Management, LP
Its: Attorney-in-Fact

By: /s/ Bihua Chen
Name: Bihua Chen
Title: Managing Member of the GP

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first written above.

INVESTORS

COWEN HEALTHCARE INVESTMENTS II LP

By: Cowen Healthcare Investments II GP LLC
Its: General Partner

By: /s/ Kevin Raidy
Name: Kevin Raidy
Title: Managing Partner

CHI EF II LP

By: Cowen Healthcare Investments II GP LLC
Its: General Partner

By: /s/ Kevin Raidy
Name: Kevin Raidy
Title: Managing Partner

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INVESTORS

DITCH PLAINS PRIVATE INVESTMENTS LP

By: /s/ Mark A. Varrichio, Jr.
Name: Mark A. Varrichio, Jr.
Title: General Partner

[Signature Page to Amendment to Investors' Rights Agreement]

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INVESTORS

F-PRIME CAPITAL PARTNERS HEALTHCARE FUND IV LP

By: F-Prime Capital Partners Healthcare Advisors Fund IV LP
Its: General Partner

By: Impresa Holdings LLC
Its: General Partner

By: Impresa Management LLC
Its: Managing Member

By: /s/ Mary F. Pendergast
Name: Mary Bevelock Pendergast
Title: Vice President

[Signature Page to Amendment to Investors' Rights Agreement]

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INVESTORS

FRANKLIN TEMPLETON INVESTMENT FUNDS – FRANKLIN BIOTECHNOLOGY DISCOVERY FUND

By: Franklin Advisers, Inc.
Its: Investment Manager

By: /s/ Evan McCulloch
Name: Evan McCulloch
Title: Vice President

FRANKLIN STRATEGIC SERIES – FRANKLIN BIOTECHNOLOGY DISCOVERY FUND

By: Franklin Advisers, Inc.
Its: Investment Manager

By: /s/ Evan McCulloch
Name: Evan McCulloch
Title: Vice President

[Signature Page to Amendment to Investors' Rights Agreement]

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INVESTORS

G ERP LLC
G ERP LLC, acting through the Duke University Defined Benefit Plan Master Trust
By: DUMAC, Inc., as authorized agent of the trustee of the master trust

By: /s/ Steven M. Bischoff
Name: Steven M. Bischoff
Title: Investment Manager
DUMAC, Inc., Authorized Agent

By: /s/ Jannine M. Lall
Name: Jannine M. Lall
Title: Head of Finance & Controller
DUMAC, Inc., Authorized Agent

G HSP LLC

By: /s/ Steven M. Bischoff
Name: Steven M. Bischoff
Title: Investment Manager
DUMAC, Inc., Authorized Agent

By: /s/ Jannine M. Lall
Name: Jannine M. Lall
Title: Head of Finance & Controller
DUMAC, Inc., Authorized Agent

G JBD LLC

By: /s/ Steven M. Bischoff
Name: Steven M. Bischoff
Title: Investment Manager
DUMAC, Inc., Authorized Agent

By: /s/ Jannine M. Lall
Name: Jannine M. Lall
Title: Head of Finance & Controller
DUMAC, Inc., Authorized Agent

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INVESTORS

G LTP LLC

By: /s/ Steven M. Bischoff
Name: Steven M. Bischoff
Title: Investment Manager
DUMAC, Inc., Authorized Agent

By: /s/ Jannine M. Lall
Name: Jannine M. Lall
Title: Head of Finance & Controller
DUMAC, Inc., Authorized Agent

[Signature Page to Amendment to Investors' Rights Agreement]

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INVESTORS

GILEAD SCIENCES, INC.

By: /s/ Andrew Dickinson
Name: Andrew Dickinson
Title: EVP, Corporate Development and Strategy

[Signature Page to Amendment to Investors' Rights Agreement]

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INVESTORS

JADER TRUST NO. 4, A DELAWARE CHARITABLE TRUST

By: /s/ Matthew Ridley
Name: Matthew Ridley
Title: CEO, WINDMILL HILL ASSET MANAGEMENT LTD.

By: /s/ Ben Legge
Name: Ben Legge
Title: CIO, WINDMILL HILL ASSET MANAGEMENT LTD.

[Signature Page to Amendment to Investors' Rights Agreement]

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INVESTORS

LAURION CAPITAL MASTER FUND LTD

By: Laurion Capital Management LP
Its: Investment Manager

By: /s/ Jason Riesel
Name: Jason Riesel
Title: General Counsel & CCO

By: /s/ Masih Mohebbi
Name: Masih Mohebbi
Title: CFO

[Signature Page to Amendment to Investors' Rights Agreement]

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INVESTORS

/s/ George W. Lloyd
George W. Lloyd

[Signature Page to Amendment to Investors' Rights Agreement]

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INVESTORS

/s/ Robert Millman
Robert Millman

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INVESTORS

OCV FUND I, L.P.

By: OCV I GP, LLC
Its: General Partner

By: /s/ Mark Yung
Name: Mark Yung
Title:

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INVESTORS

OSAGE UNIVERSITY PARTNERS II, LP

By: Osage University GP II, LLC
Its: General Partner

By: /s/ William Harrington
Name: William Harrington
Title: Member

[Signature Page to Amendment to Investors' Rights Agreement]

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INVESTORS

PONTIFAX GLOBAL FOOD AND AGRICULTURE TECHNOLOGY FUND, L.P.

By: Pontifax Global Food and Agriculture Technology GP LLC
Its: General Partner

By: Adrenalin Properties Limited
Its: Managing Member

By: /s/ Philip R. Erlanger, Ph.D.
Name: Philip R. Erlanger, Ph.D.
Title: Managing Partner

GREYFOX PARTNERS LLC

By: /s/ Tasvir Patel
Name: Tasvir Patel
Title: Managing Partner

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first written above.

INVESTORS

RA CAPITAL HEALTHCARE FUND, L.P.

By: RA Capital Management, LLC
Its: General Partner

By: /s/ James Schneider
Name: James Schneider
Title: Authorized Signatory

[Signature Page to Amendment to Investors' Rights Agreement]

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INVESTORS

/s/ James F. Reddoch III
James F. Reddoch III

[Signature Page to Amendment to Investors' Rights Agreement]

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INVESTORS

REV CAPITAL II, LLC

By: /s/ Eric I. Richman
Name: Eric I. Richman
Title: Manager

[Signature Page to Amendment to Investors' Rights Agreement]

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INVESTORS

RFS PARTNERS, LP

By: RFS & Associates, LLC
Its: General Partner

By: /s/ Raymond F. Schinazi
Name: Raymond F. Schinazi
Title: Manager

[Signature Page to Amendment to Investors' Rights Agreement]

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first written above.

INVESTORS

/s/ Marshall J. Urist
Marshall J. Urist

[Signature Page to Amendment to Investors' Rights Agreement]

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INVESTORS

VENBIO GLOBAL STRATEGIC FUND, L.P.

By: venBio Global Strategic GP, L.P.
Its: General Partner

By: venBio Global Strategic GP, Ltd.
Its: General Partner

By: /s/ Robert Adelman
Name: Robert Adelman
Title: Director

[Signature Page to Amendment to Investors' Rights Agreement]

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INVESTORS

DSAM LONG/SHORT EQUITY MASTER FUND

By: /s/ Steve Chapman
Name: Steve Chapman
Title: COO/Director

DSAM+ MASTER FUND

By: /s/ Steve Chapman
Name: Steve Chapman
Title: COO/Director

DSAM NEUTRAL MASTER

By: /s/ Steve Chapman
Name: Steve Chapman
Title: COO/Director

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first written above.

INVESTORS

LAV BIOSCIENCES FUND V, L.P.

By: LAV GP V, L.P.
Its: General Partner

By: LAV Corporate V GP, Ltd.
Its: General Partner

By: /s/ Yu Luo
Name: Yu Luo
Title: Authorized Signatory

[Signature Page to Amendment to Investors' Rights Agreement]

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first written above.

INVESTORS

/s/ Matthew Kane
Matthew Kane

/s/ Derek Jantz
Derek Jantz

/s/ Jeff Smith
Jeff Smith

[Signature Page to Amendment to Investors' Rights Agreement]

Exhibit 5.1

SMITH, ANDERSON, BLOUNT, DORSETT,
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MARCH 18, 2019

Precision BioSciences, Inc.
302 East Pettigrew St., Suite A-100
Durham, North Carolina 27701

Ladies and Gentlemen:

We have acted as counsel for Precision BioSciences, Inc., a Delaware corporation (the "Company"), in connection with the Registration Statement (File No. 333-230034) on Form S-1, as amended from time to time (the "Registration Statement"), filed with the Securities and Exchange Commission (the "Commission") under the Securities Act of 1933, as amended (the "Act"). The Registration Statement relates to the offer and sale of up to 9,085,000 shares (the "Shares") of the Company's common stock, par value $0.000005 per share (the "Common Stock"), which includes Shares that may be issued by the Company pursuant to the exercise of an option to purchase additional shares granted to the underwriters. The term "Shares" shall include any additional shares of Common Stock registered by the Company under Rule 462(b) under the Act in connection with the offering contemplated by the Registration Statement.

This opinion is furnished in accordance with the requirements of Item 601(b)(5)(i) of Regulation S-K under the Act.

We have examined originals or copies, certified or otherwise identified to our satisfaction, of (i) the Registration Statement and the exhibits thereto; (ii) the Company's Third Amended and Restated Certificate of Incorporation, as amended, as currently in effect; (iii) the Company's Bylaws, as currently in effect; (iv) the Company's Amended and Restated Certificate of Incorporation and the Company's Amended and Restated Bylaws, a form of each of which has been filed as an exhibit to the Registration Statement; (v) the underwriting agreement relating to the offering of the Shares (the "Underwriting Agreement"), the form of which has been filed as an exhibit to the Registration Statement; and (vi) such other corporate documents, records and proceedings, minutes, consents, actions and resolutions as we have deemed necessary for the purposes of our opinion.

In our examination, we have assumed the legal capacity of all natural persons, the genuineness of all signatures, the authenticity of all documents submitted to us as originals, the conforming to originals of all documents submitted to us as copies, and the authenticity of originals of such copies. We have also considered such matters of law and fact as we, in our professional judgment, have deemed appropriate to render the opinion contained herein. With respect to certain facts, we have considered it appropriate to rely upon certificates or other comparable documents

of public officials and officers or other appropriate representatives of the Company, without investigation or analysis of any underlying data contained therein.

Based upon and subject to the foregoing and the further assumptions, limitations and qualifications hereinafter expressed, it is our opinion that the Shares have been duly authorized and, when issued and delivered in accordance with the terms of the Underwriting Agreement and upon the book entry of such Shares by the transfer agent for the Common Stock, will be validly issued, fully paid and non-assessable.

The opinion set forth herein is limited to matters governed by the General Corporation Law of the State of Delaware, and no opinion is expressed herein as to the laws of any other jurisdiction. The opinion expressed herein does not extend to compliance with federal or state securities laws relating to the sale of the Shares.

Our opinion expressed herein is as of the date hereof, and we undertake no obligation to advise you of any changes in applicable law or any other matters that may come to our attention after the date hereof that may affect our legal opinion expressed herein.

We consent to the filing of this opinion letter as an exhibit to the Registration Statement and to all references to us in the Registration Statement, including the prospectus and any amendment or supplement thereto, and to the incorporation by reference of this opinion letter into any registration statement filed pursuant to Rule 462(b) with respect to the Shares. Such consent shall not be deemed to be an admission that our firm is within the category of persons whose consent is required under Section 7 of the Act or the regulations promulgated pursuant to the Act.

Sincerely yours,

SMITH, ANDERSON, BLOUNT, DORSETT,
MITCHELL & JERNIGAN, L.L.P.

/s/ Smith, Anderson, Blount, Dorsett, Mitchell & Jernigan, L.L.P.

Exhibit 10.5

LEASE AGREEMENT BY AND BETWEEN

VENABLE TENANT, LLC, as Landlord

AND

PRECISION BIOSCIENCES, INC., as Tenant

TABLE OF CONTENTS

1. Defined Terms. Capitalized words and phrases used in this Lease have the following meanings:

1.01 **Additional Rent** – all sums other than Base Annual Rent payable by Tenant to Landlord pursuant to the terms of this Lease, including, but not limited to, Tenant's Proportionate Share of Operating Expenses.

1.02 **Applicable Laws** – collectively, any local, state or Federal laws, statutes, rules, regulations, ordinances, and court or judicial orders and decrees.

1.03 **Audit Notice** – a written notice that Tenant wishes to examine itself or to employ a nationally-recognized consulting firm (on a capped contingency fee basis) or an independent certified public accounting firm (on an hourly rate basis) reasonably acceptable to Landlord, to inspect and audit Landlord's books and records in order to confirm the accuracy of the Statement.

1.04 **Base Annual Rent -** a base annual rental equal to the product of (x) the Base Rate multiplied by (y) the Net Rentable Area.

1.05 **Base Annual Rent Escalation** – the increase in the CPI with a floor of two and one-half percent (2.5%) and a ceiling of three percent (3%).

1.06 **Base Rate** – Seventeen and 85/100 Dollars ($17.85) per rentable square foot for the first twelve (12) months following the Commencement Date, and thereafter increased by the Base Annual Rent Escalation.

1.07 **Building** – the Dibrell A Warehouse Building at 302 East Pettigrew Street, Durham, North Carolina.

1.08 **Commencement Date** – the later to occur of: (i) October 1, 2010, or (ii) completion of the Tenant Improvements as evidenced by the issuance of a certificate of occupancy by the City of Durham and certification of substantial completion by the Tenant's architect.

1.09 **Common Areas** – the driveways, parking areas, pedestrian sidewalks, common conference rooms, kitchen areas, lobbies, stairways, entranceways, bathrooms and canteens, if any, provided by Landlord as a convenience for use in common by Landlord and all tenants of the Building as an appurtenance to the Premises, each building in the Project, and the Project.

1.010 **Controllable Expenses** – all Operating Expenses, excluding utilities (e.g., electricity, gas, water and sewer), property taxes, and insurance, for which Landlord has an opportunity to select vendors and negotiate rates with the selected vendors, as reasonably determined by Landlord.

1.011 **CPI** – shall mean an amount determined by multiplying the Base Annual Rent by a fraction, the denominator of which is the Revised Consumer Price Index for All Urban Consumers – New Series (1982-1984 = 100) U.S. City Average, All Items, as published by the Bureau of Labor Statistics, U.S. Department of Labor (the "Price Index"), for the first month of the First Lease Year, and the numerator of which is said Price Index for the next to last month of the Lease Year just concluding. In the event that the United States Bureau of Labor Statistics shall discontinue the issuance of the Price Index, then the rental adjustment provided for herein shall be made on the basis of changes in the most comparable and recognized cost of living index then issued and available, which is published by the United States Government.

1.012 **Force Majeure** – delays beyond the control of Landlord or Tenant, including, but not limited to, permitting, availability of materials, acts of God, Tenant Delays, and inclement weather.

1.013 **Guarantor –** N/A.

1.014 **Hazardous Material** – any hazardous or toxic substance, pollutant, contaminant, gas, toxic mold, or petroleum product defined as such in (or for purposes of) Hazardous Material Laws.

1.015 **Hazardous Material Laws –** collectively, the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, any so-called "Superfund" or "Superlien", law, the Toxic Substances Control Act, as amended, or any other Federal, state or local statute, law, ordinance, code, rule, regulation, order or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic or dangerous waste, substance or material, as now or at any time hereafter in effect, or any other hazardous, toxic or dangerous, waste, substance or material, gas or petroleum product.

1.016 **Land** – certain land in the County of Durham, City of Durham, State of North Carolina, upon which the Building and Project are located and which is more particularly described in Exhibit A.

1.017 **Landlord** – Venable Tenant, LLC, a North Carolina limited liability company.

1.018 **Landlord Party** – collectively, the Landlord and its agents, employees, officers, invitees, licensees and independent contractors.

1.019 **Lease** – this Lease Agreement.

1.020 **Lease Year** – the first twelve (12) months following the Rent Commencement Date (said first twelve (12) month period will be the first "Lease Year") and each successive twelve-month period during the Term following the expiration of the first Lease Year.

1.021 **Master Lease** – that Master Lease dated July 11, 2006, pursuant to which the Prime Tenant leased the Building and the Land from the Prime Landlord.

1.022 **Net Rentable Area** – Eight Thousand Two Hundred Seventy-Four (8,274) rentable square feet, per BOMA measurement standards.

1.023 **Operating Expenses** – any and all reasonable charges, fees, costs, and expenses actually incurred by Landlord in connection with the management, operation, ownership, maintenance, security, servicing, insuring, and repair of the Building or Project, and will include, without limitation, the following:

(1) Premiums, deductibles, and other charges for insurance;

(2) Real Estate Taxes;

(3) Management fees and personnel costs (including all fringe benefits, workers' compensation insurance premiums and payroll taxes);

(4) Costs of service, access control, and maintenance contracts;

(5) Maintenance, repair, and replacement expenses and supplies;

(6) Depreciation/amortization for capital repairs or expenditures made by Landlord to reduce operating expenses if Landlord reasonably estimates (and documents) that the annual reduction in Operating Expenses will exceed such depreciation or to comply with legal, insurance, or governmental requirements (or repair/maintenance requirements under the Lease);

(7) Charges for janitorial, window, day porter, and cleaning services and supplies;

(8) Any business, professional, or occupational license tax payable by Landlord or other tax or surcharge (or alternative payment or fee levied, charged, or assessed by a governmental entity in addition to or in lieu of a tax, license, or fee);

(9) Reasonable reserves for such replacements, repairs, and contingencies that would be treated as Operating Expense under this Lease;

(10) Sales, use, and personal property taxes payable in connection with tangible personal property and services purchased;

(11) Accounting and audit fees relating to the determination of Operating Expenses (and of Tenant's Proportionate Share thereof) and the preparation of statements required by tenant leases and legal fees (except as provided below);
(12) Expenses incurred in connection with any concierge services;
(13) The rental value of any management office;
(14) Special assessments, fees, charges, levies, penalties, service payments, excises, assessment charges and costs for transit, transit encouragement traffic reduction programs, or any similar purpose;
(15) All costs of operating maintaining, repairing and replacing improvements in any Common Areas; and
(16) Any other reasonable expense actually incurred by Landlord in maintaining, repairing, or operating the Building or the Project.

The following costs and expenses will be excluded from Operating Expenses for the Building and the Project:
(1) Costs in connection with any structural repair or major change in the Building;
(2) Costs, including permit, license, and inspection costs, associated with alterations or improvements of the Premises, the premises of other tenants or occupants of the Building or Project, or incurred in renovating or otherwise improving, decorating, painting or redecorating vacant space for tenants or other occupants of the Building or Project;
(3) Depreciation of the Building or Project, fixtures or equipment;
(4) Interest, points, fees, and principal payments on mortgages and other debt costs, if any, or amortization on any mortgage or mortgages or any other debt instrument encumbering the Building or Project or the Land;
(5) Costs for which Landlord is reimbursed by its insurance carrier, any tenant's carrier, any tenant, any warrantor, or any other third party, to the extent of the reimbursement and not including deductibles;
(6) Any bad debt loss, rent loss, reserves for bad debts or rent loss, or legal fees incurred in collecting rent or other obligations from other Building or Project tenants;
(7) The cost of services provided to certain tenants of the Building or Project beyond those provided to all Building or Project tenants, and costs incurred by Landlord in respect of breaches of other leases in the Building or Project;
(8) Costs associated with the operation of the business of the person or entity which constitutes Landlord, as distinguished from the costs of operation of the Building or Project, including accounting and legal matters, costs of defending any lawsuits with any mortgagee, costs of selling, syndicating, financing, mortgaging or hypothecating any of Landlord's interest in the Building or Project, costs of any disputes between Landlord and its employees, disputes of Landlord with Building or Project management, and outside fees paid in connection with disputes with other tenants and salaries, wages or other compensation above the level of property manager;
(9) Any expenditures which under normal accounting rules should be treated as capital expenditures, except depreciation/amortization for such capital repairs or expenditures made by Landlord for the purpose of reducing Operating Expenses of the Building or Project as set forth above;
(10) Costs of repairs or replacements caused by the exercise of any condemnation rights by any public or quasi-public authority;

(11) Charitable and political contributions, advertising, marketing, and promotional expenditures, including costs of staging special events (unless applied for the benefit of all tenants or the Building or Project as a whole, or as necessary to provide service in accordance with a first-class standard, e.g., expenses for an annual Building or Project holiday party);

(12) Marketing costs and other costs and expenses incurred in connection with lease, sublease and/or assignment negotiations and transactions with present or prospective tenants or other occupants of the Building or Project;

(13) Property management fees in excess of 4% of gross rental receipts;

(14) Costs representing amounts paid to an affiliate of Landlord for services or materials which are in excess of the amounts which would have been paid in the absence of such relationship; and

(15) Any costs, fines, or penalties incurred because Landlord violated any Applicable Law.

1.024 **Parking** – non-exclusive use of twenty (20) parking spaces.

1.025 **Permitted Use –** general office and laboratory use for a biotechnology company (or for any other legal use with Landlord's prior written consent which Landlord may withhold in its reasonable discretion.

1.026 **Premises – certa**in premises known as Dibrell A-100, a floor plan of which is attached hereto and made a part hereof as Exhibit B.

1.027 **Premises Specifications** – the specifications to which the Premises are to be constructed as described in Exhibits C and D.

1.028 **Prime Landlord** – Pettigrew Street Partners, LLC.

1.029 **Prime Tenant** – Venable Investor, LLC.

1.030 **Project** – The Venable Center.

1.031 **Real Estate Taxes** – any and all taxes (including special assessments) that are payable within a particular calendar year, including all taxes imposed on the Project and the Land. Real Estate Taxes will include, without limitation, (i) all real estate taxes, rates, and assessments (including general and special assessments, if any), ordinary and extraordinary, foreseen and unforeseen, which are imposed upon Landlord or assessed against the Project or the Land, (ii) personal property taxes applicable to the personalty of Landlord, whether used by Landlord or its agent, related to or used in the management or operation of the Project, (other than such taxes based upon Landlord's net income), (iii) any other present or future taxes or charges that are imposed upon Landlord or assessed against the Project or the Land which are in the nature of or in substitute for real estate taxes, including any tax levied on or measured by the gross rents payable by tenants of the Project, any public safety fee or similar charge, any transit, sales, rental, use, receipts, or occupancy tax or fee, and any assessment imposed in connection with business improvement or similar districts, (iv) public space rentals, including but not limited to vault rentals, and (v) all reasonable costs and expenses actually incurred by Landlord, including without limitation reasonable attorneys' fees and consultants' fees and court costs, in connection with reviewing, protesting, or seeking a reduction or abatement of, or defending or otherwise participating in any challenge to, real estate taxes, but only if (i) Tenant approves such protest; or (ii) to the extent said protest or reduction is ultimately successful. If the levy will be levied or imposed on the Project, and/or Land and/or Landlord, in substitution for real estate taxes and/or personal property taxes presently levied or imposed on immovables in North Carolina, and including also without limitation any Project dues or assessments, any taxes on

rents, or alternative which may be enacted by the taxing municipality to pay for municipal services or as a money raising action, whether temporary or permanent, then any such new tax or levy will be included within the amount of Real Estate Taxes of which Tenant will pay its Proportionate Share. Real Estate Taxes will not include, nor will Tenant be obligated to pay pursuant to this Lease, such taxes as capital gains, corporation, unincorporated business, income, profit, excess profit, inheritance, transfer, recordation, estate, gift or franchise taxes, or any fines, penalties and/or interest on late payments of any Real Estate Taxes (unless such late payment is caused by Tenant's failure to make timely payment of any installments of its Proportionate Share of increases in Real Estate Taxes, in which case Tenant will be solely liable to reimburse Landlord for the entirety of any such fine, penalty and/or interest).

1.032 **Renewal Term** – two (2), three (3) year options to renew at the lesser of the (i) then escalated Base Annual Rate, or (ii) ninety five (95%) percent of the then current market rental rate for comparable laboratory space in downtown Durham, as reasonably determined by Landlord.

1.033 **Rent** – collectively, the Base Annual Rent and the Additional Rent.

1.034 **Rent Abatement –** the first five (5) months of the Term.

1.035 **Rent Commencement Date –** the date which is the first day following expiration of the Rent Abatement period.

1.036 **Security Deposit** – the equivalent of six (6) months Base Annual Rent, Seventy-Three Thousand Eight Hundred Forty-Five and 45/100 dollars ($73,845.45) in the form of a Letter of Credit to be held by Landlord as security for the performance by Tenant of all obligations imposed on Tenant pursuant to the Lease.

1.037 **Statement** – a written statement submitted within one hundred and twenty (120) days after the end of each calendar year by Landlord to Tenant showing (i) Tenant's actual Proportionate Share of the amount by which Operating Expenses incurred during the preceding calendar year exceed the Operating Expenses for the Base Year, (ii) the amount thereof paid by Tenant, and (iii) the balance due or the overpayment.

1.038 **Sublease** – that sublease dated July 11, 2006, pursuant to which the Landlord has leased the entirety of the Building and the Land from the Prime Tenant.

1.039 **Tenant** – Precision BioSciences, Inc.

1.040 **Tenant Delay** – any verifiable act or omission by Tenant, or a Tenant Party that proximately results in a delay hereunder. (as reasonably documented by Landlord).

1.041 **Tenant's Forecast Operating Expenses** – a written statement of Landlord's reasonable estimate of Tenant's Proportionate Share of Operating Expenses for each calendar year (or portion thereof) during the Term or Renewal Term presented to Tenant prior to the beginning of each calendar year. Operating Expenses for 2010 are estimated to be $3.91 per rentable square foot.

1.042 **Tenant Improvements** – the improvements constructed to prepare the Premises for occupancy by Tenant as described in Exhibit D.

1.043 **Tenant Improvement Allowance –** Fifty dollars **(**$50.00) per rentable square foot for a total of Four Hundred Thirteen Thousand Seven Hundred Dollars ($413,700.00). The Tenant Improvement Allowance shall be used to fund (listed in order of payment): Landlord Design Oversight (5% of Construction and Design Costs), Design Fees, Permit Fees, Construction Contingency (5% of Construction Costs), Construction Payment and Performance Bonds, and Construction Costs.

1.044 **Tenant Improvement Overage** – all costs for the Tenant Improvements minus the Tenant Improvement Allowance.

1.045 **Tenant Party** – collectively, the Tenant and its agents, employees, officers, invitees, licensees and independent contractors.

1.046 **Tenant's Proportionate Share** – a percentage which represents the ratio that the number of rentable square feet of the Premises bears to (i) the rentable square footage of the Building for invoices associated specifically with the Building (e.g., building common area janitorial, common area utilities, termite treatment, etc.) which is 16.01409% or (ii) the rentable square footage of the Project for invoices associated with the Project (e.g. property taxes, insurance premiums, landscaping, security, snow/ice removal, etc.) which is 9.63404%. Tenant's Proportionate Share for any partial calendar year during the Lease Term will be determined by multiplying the amount of Tenant's Proportionate Share of increases in Operating Expenses for the full calendar year by a fraction, the numerator of which is the number of days during such calendar year falling within the Lease Term or Renewal Term and the denominator of which is three hundred sixty-five (365) Tenant shall have the right to confirm the measurement of the Premises and its Proportionate Share, and receive appropriate Rent and Tenant Improvement Allowance adjustments, increases, and/or refunds, to the extent Tenant discovers an error and provides evidence of same to Landlord for reasonable confirmation by Landlord.

1.047 **Term** – sixty-five (65) months.

1.048 **Termination Date** – that date which is sixty-five (65) months after the Commencement Date.

2. Recitals. This Lease is made and entered into as of the 5th day of April, 2010, by and between the Landlord and the Tenant. The parties hereto acknowledge that Landlord has leased the entirety of the Building and the Land from the Prime Tenant pursuant to the Sublease and that the Prime Tenant has leased the Building and the Land from the Prime Landlord pursuant to the Master Lease. Upon the execution of this instrument, Landlord will sublease the Premises to Tenant. While the transaction effected hereby would be a sublease, and the Landlord and Tenant are respectively, sublandlord and subtenant, for ease of reference, this instrument is referred to as a Lease, and the parties referred to as Landlord and Tenant, and Landlord hereby confirms that it has authority to sublease the Premises to Tenant. Now therefore, in consideration of the foregoing and the mutual covenants provided herein, the parties hereto agree as follows:

3. Premises. In consideration of the obligation of Tenant to pay rent as herein provided, and in consideration of the other terms, provisions and covenants hereof, Landlord hereby leases to Tenant and Tenant hereby leases from Landlord the Premises for the Permitted Use. The Premises are comprised of the Net Rentable Area in the Building situated on the Land in the County of Durham, City of Durham, State of North Carolina, more particularly described on Exhibit A, attached hereto and incorporated herein by reference, together with all rights, privileges, easements, appurtenances and immunities belonging to or in any way pertaining to the Premises. Except as provided herein (and subject to latent defects not readily apparent through visual inspection and identified "punchlist" items, which Landlord shall repair within a reasonable amount of time), Tenant shall lease the Premises "as is" with no representations or warranties made by Landlord as to the condition of the Premises To the best of its knowledge, Landlord represents and warrants that as of this date, the Premises are in material compliance with all Applicable Laws, and are in good condition and repair subject to reasonable wear and tear. In addition, Landlord shall use all reasonable efforts to insure that as of the Commencement Date (modified as provided herein), the Premises will be in material compliance with all Applicable Laws and are in good condition and repair. To the best of Landlord's knowledge, Applicable Laws and any recorded restrictive covenants permit the Premises to be used for the Permitted Use.

The Building is part of the Project and consists of a total of Eighty-Five Thousand Six Hundred and Twenty-Two (85,622) rentable square feet with the Building being comprised of Fifty One Thousand Six Hundred Sixty-Seven (51,667) rentable square feet. Landlord hereby represents and warrants to Tenant that the foregoing representations regarding rentable square feet are consistent with the definition of rentable area calculated pursuant to Building Owners and Managers Association Standards. A floor plan of the Premises is attached hereto and made a part hereof as Exhibit B. As an appurtenance to the Premises, Tenant, its employees and invitees will have the nonexclusive right to use the Common Areas at the Building.

Within five business days of the Commencement Date, Tenant will, upon demand of Landlord, execute and deliver to Landlord a letter of acceptance of delivery of the Premises (subject to latent defects not readily apparent through visual inspection and identified "punchlist" items, which Landlord shall repair within a reasonable amount of time), acknowledging the Commencement and Termination Dates of this Lease.

Except for any items the cost of which is paid out of the Tenant Improvement Allowance, Landlord shall perform, at its sole cost and expense, all work detailed on Exhibit C hereto. The upfit of the Premises, will be performed by Landlord in accordance with the Premises Specifications in the Work Letter, if applicable attached hereto and made a part hereof Exhibit D.

Subject to reasonable rules and regulations as Landlord may from time to time prescribe and subject to rights of ingress and egress of other tenants of the Project, Tenant and its invitees will have the right to the non-exclusive usage of twenty (20) parking spaces. Landlord will not be responsible for enforcing Tenant's parking rights against any third parties.

Tenant is granted a non-exclusive right to use, in common with the other tenants and users of the Project, all of the Common Areas. Landlord shall have exclusive control and management responsibility of the Common Areas. Landlord may, from time to time, alter the Common Areas, install kiosks, planters, fountains, sculptures, signs, and other structures within the Common Areas provided however that any such alterations shall not materially and adversely interfere with Tenant's use or enjoyment of the Premises or decrease Tenant's parking spaces. Landlord shall have the right to establish, modify, and enforce reasonable rules and regulations with respect to the Common Areas and to grant to individual tenants the right to conduct retail sales within the Common Areas. Landlord makes no representation or warranty concerning the size of the Common Areas and may, in the future, reduce the size of the Common Areas in its reasonable discretion, provided however that such reduction shall not materially and adversely interfere with Tenant's use or enjoyment of the Premises, and shall result in a commensurate reduction in Tenant's Proportionate Share.

Landlord hereby grants to Tenant a continuing right of first refusal to lease vacant and available space in the Building (the "Additional Space") under the terms and conditions as provided below:

(i) Subordinate to other tenants at the Project with pre-existing First Right of Refusal, and so long as there is no event of default by Tenant hereunder beyond any applicable grace and/or cure period, Landlord will notify Tenant when it has all or a portion of the Additional Space for lease to a third party (the "Third Party") and the terms and conditions upon which it is willing to lease such space ("Landlord's Notice").

(ii) Tenant shall provide written notice to Landlord, as to Tenant's decision to lease or not to lease the Additional Space within five (5) business days after Landlord's Notice is received. If Tenant does provide to Landlord notice to lease the Additional Space, Landlord and Tenant will execute a lease amendment adding the Additional Space to the Premises within twenty (20) days after Landlord's receipt of Tenant's notice of intent to lease on all the same terms provided to the Third Party. If Tenant does not provide written notice to Landlord within five (5) business days after receipt of the Landlord's Notice, Tenant will have been deemed to have waived its right to lease the Additional Space and Landlord shall be free to enter into a lease with the Third Party. Should all or any portion of the Additional Space become vacant thereafter, Tenant shall again have the right of first refusal provided herein.

(iii) The rights provided to Tenant in this Section are personal to the Tenant and may not be assigned in connection with an assignment of this Lease, subletting of the Premises or otherwise, except for any Permitted Transferee (as hereinafter defined).

4. Term. The Term of the Lease will begin on the Commencement Date and end on the Termination Date, unless sooner terminated or extended pursuant to the provisions hereof. The Commencement Date and Termination Date will be extended at the option of Landlord due to Force Majeure. Landlord shall use commercially reasonable measures to ensure that the Commencement Date is no later than October 1, 2010. In the event that the Commencement Date is later than February 1, 2011 for reasons other than a Tenant Delay or Force Majeure, and provided there is no default or event of default by Tenant hereunder, Tenant shall, by written notice to Landlord on or prior to February 6, 2011 (time being of the essence), have the right to terminate this Lease and all of its obligations hereunder (as of the date of giving such notice), and the parties hereto shall have no further obligation to each other hereunder.

Provided there is no default or event of default by Tenant hereunder at the time such rights are exercised or when a Renewal Term will commence, Tenant will have the option to extend the term of this Lease for two (2) Renewal Terms each of three (3) Lease Years by providing Landlord written notice of its desire to do so at least one hundred and eighty (180) days prior to the end of the then current term hereof. The date of the commencement of the Renewal Term will be the day after the expiration of the then current term of the Lease (unless sooner terminated as provided herein). All terms and conditions of this Lease will be in effect during the Renewal Term, except that (i) the Base Annual Rent will be the lesser of (a) ninety-five percent (95%) of the then market rate for comparable laboratory space in downtown Durham, as determined in accordance with this Section 4, or (b) the increase in the CPI with a floor of two and one-half percent (2.5%) and a ceiling of three percent (3%) but in no event shall Base Annual Rent be less than that paid the previous Lease Year, and (ii) upon the exercise of the right to renew hereunder, a right of Tenant to renew or extend the term hereof will have lapsed. Failure of Tenant to comply strictly with the provisions of this subparagraph will render the rights of Tenant in this subparagraph null and void. The rights granted to Tenant in this subparagraph are personal to Tenant and will not inure to the benefit of any successor or assign of Tenant, except for any Permitted Transferee.

The market rate shall mean the fair market base rent, without deduction for the cash value of free rent and leasehold improvements, which renewing, non-equity tenants are then receiving in connection with a lease for comparable space in the Durham, North Carolina area. Promptly following receipt by Landlord of Tenant's renewal notice, Landlord shall notify Tenant of the amount that, in Landlord's reasonable opinion, represents the market rate during the Renewal Term. Within fifteen (15) days of such notice, (a) if Tenant agrees, Tenant shall notify Landlord that Tenant so agrees that the Base Annual Rent therein provided constitutes the market rate, or (b) if Tenant disagrees, Tenant shall specify what Base Annual Rent, in Tenant's opinion, constitutes the market rate, or (c) if Tenant does not respond, Tenant shall be deemed to agree. In the event Tenant agrees, then the Base Annual Rent set forth in Landlord's said notice shall be deemed the market rate. In the event Tenant disagrees as provided in clause (b) above, the following procedure shall be used in determining the market rate: The parties shall use due diligence to attempt to agree upon the market rate within seven (7) business days following the foregoing fifteen (15) day period, but, if they do not so agree, then at the request of either party to the other (the "Initial Request"), the parties shall jointly choose a real estate broker (who shall have had at least ten (10) years experience as a broker in commercial office leasing in the Durham, North Carolina area) and who has not been employed by either party, whose decision shall be final and binding. If the parties do not agree upon such a third party broker and notify in writing the other thereof within seven (7) business days of the Initial Request, then within six (6) additional business days each party shall choose a real estate broker (having the foregoing credentials) and notify in writing the other thereof, and the joint decision of such real estate brokers regarding the market rate shall be final and binding (or, failing such notice, or if such choice is made, failing notice to the other within such six (6) additional business day period, the decision of one such real estate broker timely chosen and noticed shall be final and binding). If the two (2) real estate brokers timely chosen and noticed do not agree within seven (7) business days of the end of the six (6) business day period mentioned above during which they were chosen, then they shall choose a third such real estate broker (having the foregoing credentials) within five (5) business days, and the decision of such third real estate broker regarding the market rate shall be final and binding.

5. Rent. Beginning on the Rent Commencement Date and continuing thereafter throughout the Term, Tenant will pay the Rent in monthly installments in advance, without demand, deduction or offset, in lawful money of the United States commencing on the Rent Commencement Date, and continuing on the first day of each and every month thereafter until the Termination Date. Rent payments for any fractional calendar month at the end, or the beginning of the term of the Lease, will be prorated. In the event Tenant fails to pay any installment of Rent hereunder within ten days of the due date of such installment, Tenant will pay to Landlord on demand a late charge in an amount equal to four percent (4%) of such installment. The provision for such late charge will be in addition to all of Landlord's other rights and remedies hereunder or at law and will not be construed as liquidated damages or as limiting Landlord's remedies in any manner. Commencing with the second Lease Year hereunder, Base Annual Rent will increase on each anniversary of the Rent Commencement Date by the Base Annual Rent Escalation over the Base Annual Rent paid the previous Lease Year.

Commencing January 1 of the year following the Commencement Date and continuing thereafter for each calendar year during the Term, Landlord will present to Tenant Tenant's Forecast Operating Expenses. Tenant will pay without deduction, offset, or counter claim, and otherwise in the same manner as Base Annual Rent on the first day of each calendar month during the Term, an amount equal to one twelfth (1/12) of Tenant's Forecast Operating Expenses as Additional Rent. From time to time during any calendar year, Landlord may revise Tenant's Forecast Operating Expense and adjust Tenant's monthly payments to reflect Landlord's such revisions. Promptly after the full execution of this Lease (and delivery to Tenant of a copy thereof), Tenant shall pay Landlord the first month's Rent due hereunder.

Notwithstanding the foregoing, and provided there is no default or event of default hereunder by Tenant, Base Annual Rent (but not Operating Expenses) shall be abated hereunder for the first five (5) months after the Commencement Date (the "Rent Abatement"). Tenant will be responsible for its Proportionate Share of the Operating Expenses for the Building as well as its utilities and janitorial services.

6. Operating Expenses. The accounting of the Operating Expenses will be performed in accordance with Generally Accepted Accounting Principles. For the purpose of calculating the Operating Expenses, no Controllable Expense will increase more than five percent (5%) over the charge paid by Tenant the previous Lease Year.

If the average occupancy rate of the Building Rentable Area will be less than ninety-five percent (95%) during any calendar year, or if any tenant is separately paying for (or does not require) electricity, janitorial, or other services furnished to its premises, then, for purposes of calculating Operating Expenses, the Operating Expenses for such period that vary with the level of occupancy of the Building or Project will be increased by the additional costs and expenses that Landlord reasonably estimates would have been incurred if the average occupancy rate had been ninety-five percent (95%) for such period. In no event will the Project tenants be required to pay, in the aggregate, more than 100% of the actual Operating Expenses of the Building or Project for any calendar year, and Tenant will not be required to pay more than one hundred percent (100%) of its Proportionate Share of the total increase in Operating Expenses actually incurred for the calendar year, with such actual Operating Expenses to be determined and payments reconciled through the process described above. At Tenant's written request, Landlord will provide information sufficient to disclose or quantify adjustments made to each category of Operating Expenses increased pursuant to the provisions of this Section. For the purpose of this Section, the term "Building" will be deemed to include the roof of the Building and any extensions therefrom, courtyards, sidewalks, landscaping, and all other areas, facilities, improvements, and appurtenances relating to any of the foregoing; provided, however, that Operating Expenses for the Building will not include Operating Expenses for the Project.

Within 120 days after the end of each calendar year, Landlord will submit to Tenant the Statement showing (i) the actual Tenant's Proportionate Share of the amount by which Operating Expenses incurred during the preceding calendar year exceed the Tenant's Forecast Operating Expenses, (ii) the amount thereof paid by Tenant, and (iii) the balance due or the overpayment. If there is a balance due, Tenant will pay the balance due as Additional Rent within thirty (30) days following receipt of such Statement. If the Statement indicates an overpayment, then Landlord will credit

the net overpayment toward Tenant's next estimated payment(s) pursuant to this Section or if at the end of the Term, will refund such excess to Tenant. Tenant or its designated representative, at its sole expense, will have the right once per calendar year during the Term to audit Landlord's books and records relating to the Operating Expenses for the immediately preceding calendar year. This audit must take place on a mutually agreeable date during reasonable business hours at Landlord's office at the address stated above and only after Tenant has given Landlord at least fourteen (14) calendar days prior written notice of the date and time Tenant desires to commence such audit. If Tenant elects to audit Landlord's books and records, Tenant will have the right to perform an audit of the Operating Expenses for the immediately preceding two (2) calendar years, such audit to be conducted by a reputable accounting firm reasonably approved by Landlord. If any such audit reveals an error by Landlord resulting in an overcharge to Tenant, then Landlord will promptly reimburse Tenant for the amount erroneously charged to Tenant. Likewise, if any such audit reveals an error resulting in Tenant being undercharged, then Tenant will promptly reimburse Landlord for the amount of such deficiency. If any audit performed by Tenant reveals that the Operating Expenses in total have been overstated by more than five percent (5%), Landlord will pay and/or reimburse Tenant for the cost of the audit not to exceed Two Thousand, Five Hundred Dollars ($2,500.00).

7. Utilities and Services.

(a) Landlord shall furnish connections for each utility to the Premises to include electricity, water and sewer, and telephone as specified in Exhibit C. Landlord shall not be liable in any respect for damages to person, property or otherwise due to the interruption in any utility to the Building, nor be construed as an eviction of Tenant, nor work an abatement of rent, nor relieve Tenant from fulfillment of any covenant or agreement hereof nor give rise to any right or remedy by Tenant unless caused by the gross negligence or willful misconduct of Landlord. Landlord shall provide conduit and boxes for phone and data at the Premises. Tenant shall bear the costs and be responsible for pulling cable for phone and data from the Demarcation closet (telephone closet) and providing cabling and jacks.

(b) Landlord shall provide the following services to Common Areas of the Building:

(i) Common Area Cleaning (M, W, T, F): (Restrooms, Halls, Stairs, Lobby, Elevator and Entrance):

Clean and restock restrooms on 1st and 2nd floors
Clean elevator
Sweep stairwell and spot mop for spills
Vacuum carpet
Dust mop hard surface floors and spot mop to remove spills
Clean entrance glass doors and sills
Dust security desk and Lobby furniture; and
Once Weekly: Dust and damp wipe stairwell railings.

(ii) Lights on throughout Common Areas throughout the business day and parking lot illuminated every night

(iii) Security guard on duty Monday through Friday 8-5
(iv) HVAC to condition Common Areas during each business day with override after-hours (HVAC annual service contracts included in Operating Expenses)
(v) Landscaping every 7-10 days with day porter services to patrol, weed and clean site three times week
(vi) Fire alarm and controlled access door system monitored 24/7 (contract paid through Operating Expenses)
(vii) Elevator preventative maintenance contract and service; and
(viii) Routine maintenance of common areas including, but not limited to, bulb replacements, door adjustments, HVAC adjustments, plumbing repairs, etc.

8. Direct Tenant Expenses. Tenant will arrange for the provision of service and shall pay directly to each service provider all charges for all electricity, gas, and other utilities, janitorial, telephone and internet/data used on or from the Premises, together with any taxes, penalties, surcharges or the like pertaining thereto.

9. Security Deposit. Promptly after the full execution of the Lease (with a copy thereof delivered to Tenant), Tenant will provide Landlord with an amount equal to six (6) months of the Base Annual Rent, Seventy-Three Thousand Eight Hundred Forty-Five and 45/100 dollars ($73,845.45) to be held as Security Deposit. Provided that Landlord reasonably approves the form and substance of such, Tenant may provide a Letter of Credit in lieu of cash. Any such Letter of Credit shall be irrevocable, unconditional, payable to the order of Landlord, from an issuer reasonably approved by Landlord, in place for the Term of the Lease and any Renewal Terms hereof, and be for the full amount of the Security Deposit. Landlord will not be required to apply all or any portion of the Security Deposit with respect to any particular violation or default by Tenant but Landlord may apply all or any portion (as reasonably required to effect a cure) of the Security Deposit to any violation, breach, or default by Tenant hereunder. Landlord will be entitled to hold the Security Deposit in an account maintained by Landlord for such funds from all tenants of Landlord. Any interest paid on such an account will become a part of the Security Deposit, accrue to the benefit of the Tenant (less any customary bank fees or charges for maintaining such account), and be delivered to Tenant upon termination of this Lease provided that the Security Deposit and interest thereon have not been applied by Landlord to an event of default hereunder. Tenant will reimburse Landlord for such portions of the Security Deposit as Landlord will from time to time apply with respect to any violation, breach, or default by Tenant hereunder promptly upon written notice of such application by Landlord. Any portion of the Security Deposit which has not been appropriated by Landlord in accordance with the provisions hereof will be returned to Tenant within thirty (30) days after the termination of this Lease.

If Landlord conveys Landlord’s interest under this Lease, the Security Deposit, or any part thereof not previously applied, shall be released by Landlord to Landlord’s grantee (to the extent not applied to any default by Tenant hereunder), and if so released, Tenant agrees to look solely to such grantee for the proper application and return thereof in accordance with the Lease provided that Tenant receives written notice of such conveyance. Tenant agrees that Tenant will not assign, and that neither Landlord, nor its successors and assigns, will be bound by any such assignment, encumbrance or pledge, attempted assignment, attempted pledge, or attempted encumbrance of the Security Deposit.

Any mortgagee or ground lessor will not be responsible to Tenant for the return or application of the Security Deposit, whether or not it succeeds to the position of Landlord hereunder, unless the security deposit will have been received in hand by such mortgagee or ground lessor.

Any unperformed obligations of Landlord or Tenant under this Section will survive the termination of the Lease, for whatever reason, or any extension or renewal hereof.

Notwithstanding the foregoing and provided there is no default or event of default hereunder by Tenant (or if Tenant has committed a default or event of default more than one (1) time in any twelve (12) month period, then regardless of whether same has been cured), Landlord shall reduce the Security Deposit by the equivalent of one (1) month's Base Annual Rent, Twelve Thousand Three Hundred Seven and 58/100 dollars ($12,307.58) every three (3) months during the Lease Term commencing upon the later of (i) the satisfactory repayment of Tenant's loan as reported on Precision BioSciences, Inc. Balance Sheet dated January 8, 2010, or (ii) December 31, 2011, until such time that the equivalent of one (1) month's Base Annual Rent, Twelve Thousand Three Hundred Seven and 58/100 dollars ($12,307.58), remains as Security Deposit. With the third reduction of the Security Deposit, if paid as aforesaid, Landlord shall remit to Tenant the net interest that has accrued on the Security Deposit. Landlord shall provide Tenant written notice of any reduction in the Security Deposit and within five (5) business days thereafter, Tenant will be responsible for the re-issuance of an approved Letter of Credit each time that Security Deposit is eligible for reduction and until Tenant provides a re-issued Letter of Credit, Landlord shall have the right to use and draw upon the currently provided Letter of Credit.

10. Maintenance and Repairs. Landlord will maintain all Common Areas and Systems serving the Common Areas, the roof, downspouts, gutters, foundation, and the exterior walls (and any structural interior walls or other structural elements) of the Building in good repair, reasonable wear and tear excepted. Tenant will repair, replace and pay for, any damage to the foregoing caused by the negligence or misconduct of Tenant or any Tenant Party, or caused by Tenant's default hereunder. The term "walls" as used herein will not include windows, glass or plate glass, doors, special store fronts or office entries. Tenant will promptly give Landlord written notice of defect or need for repairs, after which Landlord will have reasonable opportunity to repair same or cure such defect. Landlord's liability with respect to any defects, repairs or maintenance for which Landlord is responsible under any of the provisions of this Lease will be limited to the cost of such repairs or maintenance or the curing of such defect.

Tenant will at its own cost and expense maintain, repair and replace the entirety of the Premises (except those for which Landlord is expressly responsible under the terms of this Lease) in as good condition as received (ordinary wear and tear excepted), promptly making all necessary repairs and replacements, including, but not limited to, heating, ventilation, cooling, plumbing, telecommunications, electrical and any other systems (the "Systems") within or serving the Premises, lighting fixtures, ballasts and bulbs, windows and window treatments, windows, glass and plate glass, doors, any special office entry, interior walls, finish work, and floors and floor coverings within or serving the Premises unless any such damage is caused by parties other than Tenant or a Tenant Party. Landlord shall insure that the Systems will be in good working order and condition upon the Commencement Date. Landlord shall assign to Tenant all warranties that

are legally assignable, and if not assignable, shall cooperate with Tenant to enforce such warranties. Landlord agrees to assign, to the extent legally assignable, any and all manufacturers' warranties for the Tenant Improvements, directly to the Tenant, which warranties shall include, but not be limited to, warranties for the Systems, which shall be the standard warranties available from the manufacturers. Additionally, Landlord acknowledges and agrees that any replacements made to any Systems, or any material components thereof (during the last 24 months of the then-existing Lease Term), shall be made by Landlord, and amortized over its useful life, and charged as a capital expense under the Operating Expense formula.

Subject to compliance with any notice and right to cure provisions contained in this Lease, if Tenant shall fail to fulfill its obligations under this Section, the Landlord may enter upon the area of the Building or the Premises as required to perform the obligations of the Tenant, and will be entitled to reimbursement from the Tenant for its actual costs and expenses in conducting such obligations. The Tenant will reimburse the Landlord for its actual costs and expense promptly upon demand made by the Landlord. The provisions of this subparagraph will not be interpreted to obligate the Landlord to perform obligations of the Tenant.

Tenant will not damage any demising wall of the Building, or disturb the integrity and support provided by any demising wall and will, at its sole cost and expense, promptly repair any damage or injury to any demising wall caused by Tenant or any Tenant Party.

11. Alterations. Except for the Tenant Improvements, Tenant will not make any alterations, additions or improvements to the Premises (including, but not limited to, roof and wall penetrations without the prior written consent of Landlord (not to be unreasonably withheld, or delayed). Tenant may, without the consent of Landlord, but at its own cost and expense and in a good workmanlike manner, erect such shelves, bins, machinery, movable lab benches, equipment, trade fixtures (defined as any fixtures used by Tenant in its specific business and not paid for by Landlord) and other non-structural interior improvements as it may deem advisable, without altering the basic character or structure of the Premises or improvements and without overloading or damaging the Premises or Building, and in each case complying with all Applicable Laws. Tenant will not make any alterations, additions or improvements to the Premises which will contravene Landlord's policies insuring against loss or damage by fire or other hazards, including but not limited to commercial general liability, or which will prevent Landlord from securing such policies in companies reasonably acceptable to Landlord. If any such alterations, additions or improvements cause the rate of fire or other insurance on the Premises by companies acceptable to Landlord to be increased beyond the minimum rate from time to time applicable to the Premises for permitted uses thereof (as reasonably documented by Landlord), Tenant will pay as Additional Rent the amount of any such increase promptly upon demand by Landlord. Within thirty (30) days receipt of reasonable documentation from Landlord following the completion of any alteration, addition, or improvement at the Premises by Tenant that requires the prior consent of Landlord, Landlord will be reimbursed for any reasonable outside consultant or design professional costs actually incurred by Landlord to review any plans or supervise construction work (not to exceed the lesser of $1,500.00 or 5% of Tenant's "hard" construction costs). No such reimbursement will be required for any alteration, addition or improvement that does not require the consent of Landlord.

Any and all alterations, additions, improvements, partitions and fixtures erected by Tenant will be the property of Landlord and will remain at the Premises upon termination of the Lease or upon earlier vacating of the Premises. All shelves, bins, machinery, trade fixtures, and other interior non-structural improvements installed by Tenant will remain the personal property of Tenant and may be removed by Tenant prior to the termination of this Lease provided such removal may be accomplished without damage to the Premises or Building that cannot be repaired by Tenant as set forth in this subparagraph. Prior to vacating the Premises, Tenant will repair any damage to the Premises or Building as a result of any alteration, addition, improvement, or repair to the Premises, or the removal of personal property or trade fixtures by Tenant, or any Tenant Party. Should Tenant fail to conduct any such repair within ten (10) days of written notice from Landlord, Landlord may, at its option, perform same, and Tenant will remit payment to Landlord for the actual cost and expense incurred by Landlord in effecting such repair promptly upon demand.

Tenant will have no authority, express or implied, to create or place any lien or encumbrance of any kind or nature whatsoever upon, or in any manner to bind, the interest of Landlord in the Premises or to charge the rentals payable hereunder for any claim in favor of any person dealing with Tenant, including those who may furnish materials or perform labor for any construction or repairs, and each such claim will affect and each such lien will attach to, if at all, only the leasehold interest granted to Tenant by this instrument. Tenant covenants and agrees that it will pay or cause to be paid all sums legally due and payable by it on account of any labor performed or materials furnished in connection with any work performed on the Premises at the request of Tenant on which any lien is or can be validly and legally asserted against its leasehold interest in the Premises or the improvements thereon and that it will save and hold Landlord harmless from any and all loss, cost or expense based on or arising out of asserted claims or liens against the leasehold estate or against the right, title and interest of Landlord in the Premises or under the terms of this Lease.

12. Assignment and Subletting. Tenant may assign this Lease in its entirety or sublease all or any portion of the Premises without the consent of Landlord to (i) any entity resulting from a merger or consolidation with Tenant, (ii) any entity succeeding to all or substantially all of the business and assets of Tenant, or (iii) any company or professional corporation or association affiliated with, owned by, or under common corporate control with Tenant (each a “Permitted Transferee”); provided, however, that the financial capacity of the Permitted Transferee must be at least equal to that of the Tenant on the date of transfer and the transfer must not be effected by Tenant as a sham transaction or a means to circumvent the intent of this Section or adversely affect the liability of Tenant hereunder. Except as herein otherwise provided, Tenant may not assign or encumber this Lease or its interest in the Premises arising under this Lease, and may not sublet any part or all of the Premises without the prior consent of Landlord, which consent Landlord will not unreasonably withhold, or delay. For the purpose of the preceding sentence, the word “assign” will be defined and deemed to include the sale or other transfer of a controlling percentage (hereafter defined) of capital stock of Tenant other than to an affiliate or subsidiary or the sale of at least fifty-one percent (51%) of the value of the assets of Tenant. The phrase “controlling percentage” means the ownership of, and the right to vote, stock possessing at least fifty-one percent (51%) of the total combined voting power of all classes of Tenant’s capital stock issued, outstanding and entitled to vote for the election of directors, or such lesser percentage as is required to provide actual control over the affairs of the corporation. Acceptance of Rent by Landlord after any non-permitted assignment will not constitute approval thereof by Landlord. Notwithstanding any contrary provision contained herein, in no event will any assignment by Tenant of all or any interest in this Lease or any subletting of all or any part of the Premises result in Tenant being released from its obligations hereunder.

In no event will this Lease be assignable by operation of any law except as provided herein, and Tenant's rights hereunder may not become, and will not be listed by Tenant as an asset under any bankruptcy, insolvency or reorganization proceedings. Tenant is not, may not become, and will never represent itself to be an agent of Landlord, and Tenant acknowledges that Landlord's title is paramount, and that it can do nothing to affect or impair Landlord's title.

If this Lease will be assigned or the Premises or any portion thereof sublet by Tenant at a rental that exceeds the rentals to be paid to Landlord hereunder, then sixty-five percent (65%) of such excess (after reduction for any expenses incurred by Tenant in conjunction with such assignment or subletting) will be due to the Landlord, upon actual receipt by Tenant.

If Tenant desires to enter into any sublease of all or any portion of the Premises or assign its interest in this Lease, Landlord will have the option to exclude from the Premises the space proposed to be sublet by Tenant or if an assignment is proposed, the entire Premises. Such exclusion or recapture by Landlord will be effective as of the proposed commencement date of the sublease or assignment. Landlord may exercise said option by giving Tenant written notice within ten (10) business days after receipt by Landlord of Tenant's request for consent to the proposed sublease or assignment. If Landlord exercises said option, Tenant will surrender possession of such space to Landlord on the effective date of exclusion or recapture of such space and neither party hereto will have any future rights or liabilities with respect to said space under this Lease. Effective as of the date of exclusion of any portion of the Premises covered by this Lease pursuant to this paragraph, (i) the Base Annual Rent will be reduced in the same proportion as the number of square feet of Net Rentable Area contained in the portion of the Premises so excluded bears to the number of square feet of Net Rentable Area contained in the Premises immediately prior to such exclusion, and (ii) the Net Rentable Area of the Premises will be decreased by the number of square feet of Net Rentable Area contained in the portion of the Premises so excluded, for all purposes under this Lease.

Landlord and Tenant acknowledge and agree that the foregoing provisions have been freely negotiated by the parties hereto and that Landlord would not have entered into this Lease without Tenant's consent to the terms of this Section.

13. Insurance. Landlord agrees to maintain standard fire and extended coverage insurance for the Building (including the Tenant Improvements) in an amount not less than the replacement cost, insuring against special causes of loss, including, the perils of fire, and lightning, such coverages and endorsements to be as defined, provided and limited in the standard bureau forms prescribed by the insurance regulatory authority for the State of North Carolina. Subject to the provisions of this Lease, such insurance will be for the sole benefit of Landlord and under its sole control.

If the Premises should be damaged or destroyed by any peril covered by the insurance to be provided by Landlord according to this section, Tenant will give prompt written notice thereof to

Landlord. This Lease will not terminate (except as specifically provided herein), and Landlord will, at its sole cost and expense, thereupon proceed with reasonable diligence to rebuild and repair the Premises to substantially the condition in which they existed prior to such damage, except that Landlord will not be required to rebuild, repair or replace any part of the partitions, fixtures, additions and other improvements which may have been placed in, on or about the Premises by Tenant (other than the Tenant Improvements). If the Premises are untenantable for the normal conduct of Tenant's business in whole or in part following such damage, the rent payable hereunder during the period in which they are untenantable will be reduced proportionately. If such repair work is not completed within one hundred eighty (180) days of such casualty, and provided there is no default or event of default hereunder by Tenant (or if Tenant has committed a default or event of default more than one (1) time in any twelve (12) month period, then regardless of whether same has been cured), then Tenant shall have the right to terminate this Lease upon written notice to Landlord (prior to actual completion of said work).

Landlord shall maintain contractual and comprehensive general liability insurance, including public liability and property damage, with a minimum combined single limit of liability of two million dollars ($2,000,000.00) for personal injuries or deaths of persons occurring in or about the Building and Premises.

Notwithstanding anything herein to the contrary, in the event the holder of any indebtedness secured by a mortgage or deed of trust covering the Premises requires that the insurance proceeds be applied to such indebtedness, and Landlord is unable to rebuild as confirmed by Landlord in writing to Tenant, then either Landlord or Tenant will have the right to terminate this Lease by delivering written notice of termination to the other party within fifteen (15) days after such requirement is made by any such holder, whereupon all rights and obligations hereunder thereafter accruing will cease and terminate.

Each of Landlord and Tenant hereby waives all rights to recover against each other or against any other tenant or occupant of the Building, or against the officers, directors, shareholders, partners, joint venturers, employees, agents, customers, invitees, or business visitors of each other or of any other tenant or occupant of the Building, for any loss or damage arising from any cause covered by any insurance required to be carried by each of them pursuant to this Lease, or any other insurance actually carried by either of them. Landlord and Tenant will cause their respective insurers to issue waiver of subrogation rights endorsements to all policies of insurance carried in connection with the Building or the Premises or the contents of either of them, and any cost for the issuance of such endorsements will be borne by the original insured under such policies.

The obligation of Landlord in this Section to repair and restore the Premises and the Building as provided herein, does not include an obligation of Landlord to repair the fixtures, equipment, or personal property of Tenant, which Tenant will insure for its benefit, and Tenant will have the obligation to repair and restore in the event of a casualty or other loss.

The period of time within which repair and restoration of the Premises must be completed will be extended due to delays occasioned by Force Majeure.

Tenant will procure and maintain, at its expense, (i) special form property insurance insuring against special causes of loss covering Tenant's personal property, equipment, trade fixtures and any improvements performed by Tenant (specifically excluding the Tenant Improvements) in the Premises; and (ii) a policy or policies of commercial general liability insurance applying to Tenant's operations and use of the Premises, providing a minimum limit of $1,000,000.00 per occurrence and $2,000,000.00 in the aggregate, naming Landlord and Landlord's property manager as additional insureds. Tenant will maintain the foregoing insurance coverages in effect commencing on the earlier to occur of the Commencement Date and the date Tenant takes possession of the Premises, and continuing to the end of the Lease Term.

The insurance requirements set forth in this Section are independent of the waiver, indemnification, and other obligations under this Lease and will not be construed or interpreted in any way to restrict, limit or modify the waiver, indemnification and other obligations or to in any way limit any party's liability under this Lease. In addition to the requirements set forth in this section, (i) the insurance required of Tenant under this Lease must be issued by an insurance company with a rating of no less than A-VIII in the current Best's Insurance Guide or that is otherwise reasonably acceptable to Landlord, and (ii) the company issuing the coverage must be authorized to conduct the business of insurance in the state in which the Building is located; (iii) the insurance must be primary insurance for all claims thereunder and provide that any liability insurance carried by Landlord, Landlord's property manager, and Landlord's lenders is strictly excess, secondary, and noncontributing with any insurance carried by Tenant; (iv) Tenant must insure that its insurance company shall endeavor to provide at least thirty (30) days prior written notice of cancellation or non-renewal of a policy to Landlord and Landlord's lenders; and (v) Tenant shall provide Landlord a copy of any notice of cancellation or non-renewal of a policy immediately upon receipt by Tenant. Tenant will deliver to Landlord a legally enforceable certificate of insurance on all policies procured by Tenant in compliance with Tenant**'**s obligations under this Lease on or before the date Tenant first occupies any portion of the Premises, at least ten (10) days before the expiration date of any policy and upon the renewal of any policy. Landlord will have the right to approve all deductibles and self-insured retentions under Tenant**'**s policies, which approval will not be unreasonably withheld, or delayed.

14. Condemnation. If the whole or any substantial portion of the Premises should be taken for any public or quasi-public use under governmental law, ordinance, or regulation, or by right of eminent domain, or by private purchase in lieu thereof, and the taking would prevent or materially interfere with the use of the Premises by Tenant for the purposes provided herein as mutually and reasonably determined by Landlord and Tenant, each party hereto will have the right to terminate this Lease by notice to the other party hereto within forty-five (45) days after the date of such taking and the Rent will be abated during the unexpired portion of this Lease, effective when the physical taking of the Premises will occur. If this Lease is not terminated in accordance with the foregoing, this Lease will remain in full force and effect as to the portion of the Premises remaining, except that the Rent will be reduced in the proportion that the taken floor area of the Premises bears to the total floor area of the Premises as reasonably determined by Landlord.

If a portion of the Premises will be taken for any public or quasi-public use under any governmental law, ordinance or regulation, or by right of eminent domain, or by private purchase in lieu thereof, and there is no material interference with the use by Tenant of the Premises as reasonably determined, this Lease will remain in full force and effect as to the portion of the Premises remaining, except that the Rent will be reduced in the proportion that the taken floor area of the Premises bears to the total floor area of the Premises.

In the event of any such taking or private purchase in lieu thereof, Landlord will be entitled to receive and retain all awards as may be awarded in any condemnation proceedings with Tenant hereby expressly waiving all claim thereto other than those specifically awarded Tenant for a taking of Tenant's personal property, loss of business and moving expenses.

15. Default. The following events will be deemed to be events of default by Tenant under this Lease:

(a) Tenant will fail to pay any installment of the Rent herein reserved, or payment with respect to taxes hereunder, or any other payment or reimbursement to Landlord required herein, within five (5) days of when due; provided, however, on one occasion during each calendar year of the term of this Lease, it shall not be an event of default hereunder if Tenant makes full payment within five (5) days after receipt of written notice from Landlord.

(b) Tenant will become insolvent, or will make a transfer in fraud of creditors, or will make an assignment for the benefit of creditors.

(c) Tenant will file a petition under any section or chapter of the Bankruptcy Reform Act, as amended or under any similar law or statute of the United States or any state thereof; or Tenant will be adjudged bankrupt or insolvent in proceedings filed against Tenant thereunder.

(d) A receiver or trustee will be appointed for all or substantially all of the assets of Tenant.

(e) Tenant will desert or vacate all or a portion of the Premises, and cease paying Rent at the Premises.

(f) Tenant will fail to yield up immediate possession of the Premises to Landlord upon termination of this Lease.

(g) Tenant will fail to comply with any term, provision or covenant of this Lease (other than the provisions of subparagraphs (a), (b), (c), (d), (e) and (f) of this Section 15), and will not cure such failure within thirty (30) days after written notice thereof to Tenant or such additional period of time as will be reasonably granted by Landlord if Tenant is acting in good faith and with diligence to complete such cure.

Upon the occurrence of any event of default in the preceding section hereof, Landlord will have the option to pursue any remedy at law or in equity, including, but not limited to, one or more of the following remedies without any separate notice or demand whatsoever:

(a) Terminate this Lease, in which event Tenant will immediately surrender the Premises to Landlord, and if Tenant fails to do so, Landlord may, without prejudice to any other remedy which it may have for possession or arrearage in Rent, enter upon and take possession of the Premises and expel and remove Tenant and any other person who may be occupying the Premises or any part thereof, by any legal means necessary without being liable for prosecution or any claim of damages therefore; secure the Premises against unauthorized entry; and Tenant agrees to pay to Landlord on demand the amount of all loss and damage which Landlord may suffer by reason of such termination, whether through inability to relet the Premises on satisfactory terms or otherwise.

(b) Enter upon and take possession of the Premises and expel or remove Tenant and any other person who may be occupying such Premises or any part thereof, by any legal means necessary without being liable for prosecution and receive the Rent thereof; secure the Premises against unauthorized entry; store any property located on the Premises at the expense of the owner thereof and Tenant agrees to pay to Landlord on demand any deficiency that may arise by reason of such reletting. In the event Landlord is successful in reletting the Premises at a rental in excess of that agreed to be paid by Tenant pursuant to the terms of this Lease, Landlord and Tenant each mutually agree that Tenant will not be entitled, under any circumstances, to such excess rental, and Tenant does hereby specifically waive any claim to such excess rental.

(c) Enter upon the Premises, by any legal means necessary without being liable for prosecution or any claim for damages therefore, secure the Premises against unauthorized entry, remove all property of Tenant from the Premises and store it at the cost and expense of Tenant, and do whatever Tenant is obligated to do under the terms of this Lease; and Tenant agrees to reimburse Landlord on demand for any expenses which Landlord may incur in thus effecting compliance with Tenant's obligations under this Lease, and Tenant further agrees that Landlord will not be liable for any damages resulting to Tenant from such action, whether caused by the negligence of Landlord or otherwise.

(d) Subject to the obligation of Landlord to mitigate its damages under Applicable Law, accelerate and demand the payment of all Rent and other charges due and payable hereunder over the term of this Lease to an amount equal to the aggregate sum which at the time of such termination represents the excess, if any, of the present value of the aggregate Rent which would have been payable after the termination date had this Lease not been terminated, including, without limitation, the amount projected by Landlord as Rent for the remainder of the Lease Term, over the then present value of the then aggregate fair rent value of the Premises for the balance of the Lease Term, such present worth to be computed in each case on the basis of the lesser of: (i) the rate on a United States Treasury bill with a maturity date equal to the termination date of the Lease, or (ii) five percent (5%) per annum discount from the respective dates upon which such Rent would have been payable hereunder had this Lease not been terminated.

Landlord's failure to perform or observe any of its Lease obligations after a period of thirty (30) days or the additional time, if any, that is reasonably necessary to promptly and diligently cure the failure after receiving written notice from Tenant is a Landlord Default. The notice shall reasonably detail the nature and extent of the failure and identify the Lease provision(s) containing the obligation(s). If Landlord commits a Landlord Default, Tenant may pursue any remedies given in this Lease or under Applicable Law.

Pursuit of any of the foregoing remedies will not preclude pursuit of any of the other remedies herein provided or any other remedies provided by law or equity, nor will pursuit of any remedy herein provided constitute a forfeiture or waiver of any Rent due to Landlord hereunder or of any damages accruing to Landlord by reason of the violation of any of the terms, provisions and covenants herein contained. No act or thing done by Landlord or its agents during the term hereby granted will be deemed a termination of this Lease or an acceptance of the surrender of the Premises, and no agreement to terminate this Lease or accept a surrender

of the Premises will be valid unless in writing signed by Landlord. No waiver by Landlord or Tenant of any violation or breach of any of the terms, provisions and covenants herein contained will be deemed or construed to constitute a waiver of any other violation or breach of any of the terms, provisions and covenants herein contained. Landlord's acceptance of the payment of rental or other payments hereunder after the occurrence of an event of default will not be construed as a waiver of such default, unless Landlord so notifies Tenant in writing, and no receipt of money by Landlord from Tenant after the termination of this Lease or after service of any notice or after the commencement of any suit or after final judgment for possession of the Premises will reinstate, continue or extend the term of this Lease or affect any such termination, notice, suit or judgment, unless Landlord so notifies Tenant in writing. Forbearance by Landlord or Tenant to enforce one or more of the remedies herein provided upon an event of default will not be deemed or construed to constitute waiver of such default or of said party's right to enforce any such remedies with respect to such default or any subsequent default.

Notwithstanding any provision contained in this Lease to the contrary, should either party institute any legal proceeding against the other for breach of any provision herein contained and prevail in such action, such other party shall reimburse the prevailing party for the expenses of such prevailing party, including, without limitation, its reasonable attorneys' fees actually incurred at standard and reasonable billing rates.

16. Holding Over and Termination. Tenant will upon the termination of this Lease by lapse of time or otherwise, yield up immediate possession to Landlord without the requirement of notice by Landlord to Tenant of the termination of this Lease, nor any grace or cure period should Tenant fail to yield up immediate possession to Landlord. Unless the parties hereto will otherwise agree in writing, if Landlord agrees in writing that Tenant may hold over after the expiration or termination of this Lease, the hold over tenancy will be subject to termination by Landlord at any time upon thirty (30) days advance written notice, or by Tenant at any time upon not less than thirty (30) days advance written notice, and all of the other terms and provisions of this Lease will be applicable during that period, except that Tenant will pay Landlord from time to time upon demand, as rental for the period of any hold over, an amount equal to one and one-half (1-1/2) the Base Annual Rent plus Additional Rent in effect on the Termination Date, computed on a daily basis for each day of the hold over period. No holding over by Tenant, whether with or without consent of Landlord, will operate to extend this Lease except as otherwise expressly provided. The preceding provisions of this Section 16 will not be construed as Landlord's consent for Tenant to hold over.

Upon the termination of this Lease for whatever reason, Tenant will quit and immediately surrender the Premises to Landlord, broom clean, in as good order and condition as received with all repairs and maintenance required by Tenant hereunder having been performed, ordinary wear and tear excepted, and Tenant will remove its personal property from the Premises in accordance with this Lease. Should any of the personal property or trade fixtures of Tenant remain upon the Premises after the Termination Date, all such property will be deemed abandoned by Tenant, and Landlord may remove same at the cost and expense of Tenant with no liability to Tenant therefore, and Tenant hereby releases Landlord from all liability therefore.

17. Compliance with Laws. The Premises will be used only for the Permitted Use. Landlord acknowledges that Tenant will be using the Premises as a laboratory for a biotechnology company and is aware that with respect to such usage, Tenant may bring a pre-approved list of Hazardous Materials onto the Premises. Tenant will conduct no activity that will result in the discharge of harmful gases, effluents or other wastes or toxic substances beyond the Premises or in violation of Applicable Laws. Outside storage, including, without limitation, trucks and other vehicles, is prohibited without Landlord's prior written consent. Tenant will at its sole cost and expense obtain any and all licenses and permits necessary for its use of the Premises. Tenant will promptly comply with all governmental orders and directives for the correction, prevention, and abatement of nuisances connected with or arising from Tenant's use of the Premises, all at Tenant's sole expense. During the Term, Landlord shall comply with all Applicable Laws regarding the Premises and Building, except to the extent Tenant must comply under this Section 17. Except as to pre-existing defects, violations or conditions, Tenant shall comply with all Applicable Laws: (i) regarding the physical condition of the Premises, but only to the extent the Applicable Laws pertain to the particular manner in which Tenant uses the Premises; or (ii) that do not relate to the physical condition of the Premises but relate to the lawful use of the Premises and with which only the occupant can comply, such as laws governing maximum occupancy, workplace smoking, and illegal business operations, such as gambling. Tenant will not permit any objectionable or unpleasant odors, smoke, dust, gas, noise or vibrations to emanate from the Premises, nor take any other action which would constitute a nuisance, disturb or endanger any other tenants of the Building, or unreasonably interfere with the quiet enjoyment by any tenant of the Building. Without Landlord's prior written consent (not to be unreasonably withheld, or delayed), Tenant will not receive, store or otherwise handle any product, material or merchandise which is explosive, inflammable, combustible, corrosive, caustic or poisonous (except as provided herein). Tenant will not permit the Premises to be used for any purpose or in any manner (including, without limitation, any method of storage) which would render the insurance thereon void or the insurance risk more hazardous or cause the State Board of Insurance or other insurance authority to disallow any sprinkler credits. Tenant will give notice to Landlord promptly upon the known occurrence of any accident in the Premises or upon Tenant's discovery of any defects thereon or in any fixtures or equipment located therein or upon the occurrence of any emergency in the Premises, Building, or Project. Tenant will be permitted to use and store at the Premises in compliance with Hazardous Material Laws and the provisions hereof commercially reasonable quantities of (i) generally available standard office and janitorial supplies that may contain chemicals categorized as Hazardous Material, and (ii) such other substances that are required in the ordinary course of Tenant's business conducted on the Premises. Tenant, at its expense, in its use of the Premises and in making any alterations, renovations, or modifications of the Premises will comply with all Applicable Laws relating to the use, condition and occupancy of the Premises.

Tenant agrees that it will not release, discharge, place, hold, or dispose of any Hazardous Material on, under or at the Premises, in the Building, or on the Land, and that it will not use the Premises, the Building, the Land, or any other portion thereof as a site for the treatment, storage (except in accordance with this Section 17), or disposal (whether permanent or temporary) of any Hazardous Material. Tenant further agrees that it will not cause or allow any asbestos to be incorporated into any improvements or alterations which Tenant makes or causes to be made to the Premises, or the Building.

Tenant hereby agrees to indemnify, defend (with counsel reasonably approved by Landlord) and hold harmless Landlord of from and against any and all losses, liabilities, damages, injuries, costs, expenses and claims of any and every kind whatsoever (including without limitation, court costs and attorneys' fees at all tribunal levels) which at any time and from time to time may be paid, incurred or suffered by, or asserted against Landlord for, with respect to, or as a direct or indirect result of any breach or default by Tenant of the provisions of this Section 17. The provisions of and undertakings and indemnification set forth in this Section will survive the termination or expiration of this Lease, for any reason, and will continue to be the liability, obligation and indemnification of Tenant, binding upon Tenant forever. The provisions of the preceding sentence will govern and control over any inconsistent provision of this Lease.

Tenant will provide Landlord with a list of any and all Hazardous Materials released, discharged, placed, held, or disposed of on the Premises, and certification to Landlord of compliance by Tenant with all Applicable Laws, concurrently with the execution of this Lease which shall be attached hereto and made a part as Exhibit G, and thereafter, within ten (10) business days of a request therefore by Landlord (which Landlord shall not request more than four times in any calendar year).

Landlord hereby represents and warrants, to the best of Landlord's actual knowledge, that no Hazardous Materials exist on, under, in or about the Premises as of the Commencement Date except as disclosed in the Phase I Environmental Site Assessment obtained by Landlord for the Building (the "Report"). Tenant shall have the right to review the Report at the offices of Landlord upon written notice to the Landlord. Landlord shall indemnify, defend and hold harmless Tenant from and against any and all Claims which at any time and from time to time may be paid, incurred or suffered by or assessed against Tenant as a direct or indirect result of the presence of any Hazardous Materials in, on or under the Premises, Building or Project prior to the Commencement Date or after the termination of this Lease so long as such presence was not due to an act or omission of Tenant or a Tenant Party.

18. Inspection. Landlord and Landlord's agents and representatives will have the right to enter and inspect the Premises at any reasonable time during business hours, for the purpose of ascertaining the condition of the Premises, in order to make such repairs as may be required or permitted to be made by Landlord to the Building or any adjacent space, under the terms of this Lease, or in order to show the Premises to any prospective purchaser or lender; provided that (i) except in the case of an emergency, Landlord has given Tenant a written or verbal notice of the intent to enter at least two (2) business days in advance of the entry, (ii) such entry and any related inspection or repairs do not unreasonably interfere with Tenant's business operations, (iii) Landlord complies with Tenant's reasonable security measures and protocols which are detailed on Exhibit F (as Tenant shall be entitled to reasonably update), attached hereto, and Tenant provides Landlord protective gear, and (iv) Landlord is accompanied by a representative of Tenant at all times, except in an emergency. During the period that is six (6) months prior to the end of the term hereof (and subject to the same access caveats listed above),

Landlord and Landlord's agents and representatives will have the right to enter the Premises at any reasonable time during business hours for the purpose of showing the Premises to any prospective tenant and will have the right to erect on the Premises a suitable sign indicating the Premises are available. Tenant will schedule with Landlord (at Landlord's request) at least sixty (60) days prior to vacating the Premises a time mutually agreeable to the parties hereto for a joint inspection of the Premises prior to vacating. In the event of Tenant's failure to reasonably arrange such joint inspection, Landlord's inspection at or after Tenant's vacating the Premises will be conclusively deemed correct for purposes of determining Tenant's responsibilities for repairs and restoration.

19. Tenant Property. Upon reasonable request, so long as Tenant is not in default under this Lease, Landlord agrees to execute, within twenty (20) days following written request, any commercially reasonable document reflecting the subordination of any such Landlord's interest to Tenant's lender(s) and in such event Tenant shall pay Landlord's reasonable and actual "out-of-pocket" costs therefore.

20. [INTENTIONALLY DELETED.]

21. Rules and Regulations. Tenant, at its expense, will comply with the Rules and Regulations of the Building attached hereto and made a part hereof as Exhibit E, as reasonably modified by Landlord from time to time and such other Rules and Regulations adopted by Landlord during the Lease Term and Tenant will use all commercially reasonable efforts to cause all Tenant Parties to do so. Provided, however, that (a) such rules and regulations do not increase the Rent payable hereunder; (b) such rules and regulations do not unreasonably and materially interfere with Tenant's conduct of its business or Tenant's use and enjoyment of the Premises for the Permitted Use; (c) Landlord provides reasonable advance written notice thereof; and (d) such rules and regulations are uniformly enforced in a non-discriminatory manner. All such additions or changes to Rules and Regulations will be sent by Landlord to Tenant in writing and shall become effective ten (10) days thereafter. In the event of a conflict between the rules and regulations and the terms of this Lease, the terms of this Lease will control.

22. Assignments by Landlord. Landlord will have the right to transfer and assign, in whole or in part, all its rights and obligations hereunder and in the Building and Project, and in such event and upon its transferee's assumption of Landlord's obligations thereafter accruing hereunder, no further liability or obligation will thereafter accrue against Landlord hereunder (provided that any such successor in interest expressly assumes the obligations of Landlord hereunder, in writing). Upon request by Landlord, Tenant agrees to execute a certificate certifying such facts as Landlord may reasonably require in connection with any such assignment by Landlord. This paragraph shall not affect Landlord's liability for matters arising prior to the transfer of the Building including the Security Deposit.

23. Quiet Enjoyment. Landlord represents and warrants that it has full right and authority to enter into this Lease and that Tenant, upon paying the rental herein set forth and performing its other covenants and agreements herein set forth, will peaceably and quietly have, hold and enjoy the Premises for the term hereof without hindrance or molestation from Landlord or any other lawful claimant to ownership or possession of the Premises, subject to the terms and provisions of this Lease.

24. Liability. Tenant specifically agrees to look solely to Landlord's (or its successors') interest in the Building (including rental income and insurance/condemnation proceeds) for the recovery of any judgment (or other judicial decree) from Landlord. Landlord (or if Landlord is a limited liability company, its members, or if Landlord is a corporation, its directors, officers or any successors in interest) shall never be personally liable for any such judgment. In no event shall Landlord be liable under this Lease for any consequential or punitive damages except to the extent caused by the gross negligence or willful misconduct of Landlord. This exculpation of liability to be absolute and without exception whatsoever.

Landlord will not be liable to Tenant or any Tenant Party, or to any other person whomsoever, for any damage to property on or about the Premises belonging to Tenant or any other person, due to any cause whatsoever, unless caused by the gross negligence or willful or intentional misconduct of Landlord.

Tenant hereby covenants and agrees that it will at all times indemnify, defend (with counsel reasonably approved by Landlord) and hold safe and harmless Landlord (including, without limitation, its trustees and beneficiaries if Landlord is a trust), and the Landlord Parties from any loss, liability, claims, suits, costs, expenses, including without limitation reasonable attorney's fees and damages, both real and alleged, incurred by Landlord or a Landlord Party arising out of or resulting from the negligence or misconduct of Tenant, a breach by Tenant of any provision of this Lease, or the conduct by Tenant of its business in the Building.

Landlord hereby covenants and agrees that it will at all times indemnify, defend (with counsel reasonably approved by Tenant) and hold safe and harmless Tenant, and the Tenant Parties from any loss, liability, claims, suits, costs, expenses, including without limitation reasonable attorney's fees and damages, both real and alleged, incurred by Tenant or a Tenant Party arising out of or resulting from the operation by Landlord of the Building, the negligence or misconduct of Landlord, or a breach by Landlord of any provision of this Lease.

25. Mortgages. Tenant accepts this Lease subject and subordinate to any mortgage(s) and/or deed(s) of trust now or at any time hereafter constituting a lien or charge upon the Premises or the improvements situated thereon; provided, however, that if the mortgagee, trustee, or holder of any such mortgage or deed of trust elects to have Tenant's interest in this Lease superior to any such instrument, then by notice to Tenant from such mortgagee, trustee or holder, this Lease will be deemed superior to such lien, whether this Lease was executed before or after said mortgage or deed of trust. Tenant will at any time hereafter on demand execute and provide to Landlord within ten (10) business days of a request therefore, any commercially reasonable instruments, releases or other documents which may be reasonably required by any mortgagee or trustee for the purpose of further subjecting and subordinating this Lease to the lien of any such mortgage or deed to trust in form and substance as reasonably required by such mortgagee or trustee. Notwithstanding the foregoing, it shall be a condition precedent to any subordination that Tenant be provided with a written non-disturbance agreement in the form stipulated by Landlord's lender (provided that: (i) Tenant shall be entitled to request of

Landlord's lender commercially reasonable revisions to said form at its cost which costs include payment of any attorneys' fees charged to Landlord by Landlord's lender (as reasonably documented by Landlord); and (ii) said form provides that, if the holder of any mortgage or deed of trust shall take title to the Premises through foreclosure or deed in lieu of foreclosure or otherwise, Tenant shall be allowed to continue in possession of the Premises as provided in this Lease so long as Tenant is not in default, beyond any applicable cure period).

26. Signs. Tenant will not be permitted any signage visible from outside of its Premises which has not been approved in writing in advance by Landlord in its reasonable discretion. The cost of or related to any approved signage will be entirely at Tenant's own expense, and all such signage shall be removed by Tenant, at its cost at the end of the term and any damage due to such removal repaired by Tenant prior to vacating the Premises. Landlord shall provide at its expense signage on the entry door to the Premises, and signage on the directory for the Building. Landlord shall provide Tenant its exterior signage criteria prior to the execution of this Lease.

27. Keys and Locks. Landlord, at its expense, shall provide Tenant with forty (40) card keys for access to the Building. Landlord acknowledges that Tenant shall have the right to install its own access control system to the Premises and Tenant shall furnish and provide Landlord with duplicate keys and/or access cards, as applicable, to ensure that Landlord and its representatives can gain access to the Premises when permitted by the terms of this Lease. Upon termination of this Lease, Tenant shall surrender to Landlord all keys to the Premises and give to Landlord the combination of all locks for safes, safe cabinets and vault doors, if any, remaining in the Premises.

28. Brokers. Landlord acknowledges that Cassidy Turley (and its successors and assigns) is acting as the sole agent for Tenant in this transaction and shall be paid a brokerage fee by Landlord pursuant to a separate agreement with Landlord. Tenant confirms that no broker other than Cassidy Turley is assisting Tenant in this matter. Landlord confirms that no broker is assisting Landlord in this matter. Landlord and Tenant covenant to pay, hold harmless and indemnify the other from and against any and all costs, expenses or liability for any compensation, commissions and charges claimed by any other broker or agent, with respect to the transactions contemplated hereby or the negotiation thereof and arising by virtue of the acts of the indemnifying party.

29. Notices. Each provision of this instrument or of any Applicable Law with reference to the sending, mailing, or delivery of any notice by either party, or with reference to the making of any payment by Tenant to Landlord will be deemed to be complied with when and if the following steps are taken:

(a) All Rent and other payments required to be made by Tenant to Landlord hereunder will be payable to Landlord at the address below or at such other address as Landlord may specify from time to time by written notice delivered in accordance herewith. Tenant's obligations to pay Rent and any other amounts to Landlord under the terms of this Lease will not be deemed satisfied until such Rent and other amounts have been actually received by Landlord.

(b) Any notice or document required or permitted to be delivered hereunder will be deemed to be delivered upon actual receipt or refusal thereof, and shall be: (i) sent by standard, commercial overnight delivery service, such as Federal Express, or (ii) sent by Certified or Registered Mail, return receipt requested, postage prepaid, and addressed to the parties hereto at the respective addresses set out below, or at other such addresses as they have heretofore specified by written notice delivered in accordance therewith.

Landlord:
Venable Tenant LLC
c/o Scientific Properties, LLC
280 Mangum Street, Suite 340
Durham, NC 27701

Tenant:
Precision BioSciences, Inc.
104 T. W. Alexander Drive
PO Box 12292
Research Triangle Park, NC 27709
Attention: Todd Melby, Chief Financial Officer/Chief Operations Officer

with a copy to:

Smith, Anderson, Blount, Dorsett,
Mitchell & Jernigan, L.L.P.
Post Office Box 2611
Raleigh, North Carolina 27602-2611
Attention: Michael P. Saber, Esq.

overnight delivery address:
2500 Wachovia Capitol Center
150 Fayetteville Street
Raleigh, North Carolina 27601

30. Miscellaneous.

(a) Words of any gender used in this Lease will be held and construed to include any other gender, and words in the singular number will be held to include the plural, unless the context otherwise requires.

(b) The terms, provisions and covenants and conditions contained in this Lease will apply to, inure to the benefit of, and be binding upon the parties hereto and upon their respective heirs, legal representatives, successors and permitted assigns, except as otherwise herein expressly provided. Landlord will have the right to assign any of its rights and obligations under this Lease. Each party agrees to furnish to the other, promptly upon demand, a resolution, or other appropriate documentation evidencing the due authorization of such party to enter into this Lease.

(c) The captions inserted in this Lease are for convenience only and in no way define, limit or otherwise describe the scope or intent of this Lease, or any provision hereof, or in any way affect the interpretation of this Lease.

(d) Tenant agrees from time to time, within ten (10) business days after request of Landlord, to deliver to Landlord, or Landlord's designee, an estoppel certificate stating, to the extent true and to Tenant's actual knowledge, that this Lease is in full force and effect, the date to which Rent has been paid, the unexpired term of this Lease and such other matters pertaining to this Lease as may be reasonably requested by Landlord. It is understood and agreed that Tenant's obligation to furnish such estoppel certificates in a timely fashion is a material inducement for Landlord's execution of this Lease.

(e) This Lease may not be altered, changed or amended except by an instrument in writing signed by both parties hereto.

(f) All obligations of Landlord and Tenant hereunder not fully performed as of the expiration or earlier termination of the term of this Lease will survive the expiration or earlier termination of the term hereof, including, without limitation, all payment obligations concerning the condition of the Premises and all obligations of Tenant as provided in Section 5 hereof.

(g) In the case of a foreclosure or deed in lieu of foreclosure on a mortgage or deed of trust existing prior to the date of this Lease, in the event of a transfer by Landlord of its interest in the Premises, Landlord will be released from all obligations and liabilities under the terms of this Lease arising subsequent to the date of such transfer. In the event a transferee will agree to assume the obligations and liabilities of Landlord under the Lease prior to the date of the transfer, Landlord will be released from all obligations and liabilities under the Lease.

(h) If any clause or provision of this Lease is illegal, invalid or unenforceable under present or future laws effective during the term of this Lease, then and in that event, it is the intention of the parties hereto that the remainder of this Lease will not be affected thereby, and it is also the intention of the parties to this Lease that in lieu of each clause or provision of this Lease that is illegal, invalid or unenforceable, there be added as a part of this Lease a clause or provision as similar in terms to such illegal, invalid or unenforceable clause or provision as may be possible and be legal, valid and enforceable.

(i) Because the Premises are on the open market and are presently being shown, this Lease will be treated as an offer with the Premises being subject to prior lease and such offer subject to the withdrawal or non-acceptance by Landlord or to other use of the Premises without notice, and this Lease will not be valid or binding unless and until accepted by Landlord in writing and a fully executed copy delivered to both parties hereto.

(j) All references in this Lease to "the date hereof" or similar references will be deemed to refer to the last date, in point of time, on which all parties hereto have executed this Lease.

(k) Time is of the essence of this Lease.

(l) Landlord will not be in default in the performance of any of Landlord's obligations hereunder unless and until Landlord will have failed to perform such duties or obligations within thirty (30) days (or such additional time as is reasonably required to correct any such default) after written notice by Tenant to Landlord properly specifying wherein Landlord has failed to perform any such duty or obligation. In cases where there is an imminent threat of harm to person or property at the Premises, or if Tenant cannot conduct its business at the Premises, Landlord shall effect a cure within a reasonable period of time using all reasonable efforts. Should a cure be required and Landlord fail to effect a cure within ten (10) business days after the date after receipt by Landlord from Tenant of written notice with respect to such

default, Tenant shall have the right to effect such cure. Except as expressly provided in this Lease to the contrary, Landlord will have no liability for any incidental or consequential damages of Tenant, or anyone claiming by, through or under Tenant, for any reason whatsoever.

(m) This Lease does not create the relationship of partner or joint venturer between Landlord and Tenant.

(n) The laws of the State of North Carolina will govern the interpretation, the validity, performance and enforcement of this Lease.

(o) (i) If Tenant is a corporation, the undersigned officer of Tenant does hereby warrant and certify to Landlord that Tenant is a corporation in good standing and duly organized under the laws of the State of North Carolina, or if chartered in a state other than the State of North Carolina, is a corporation in good standing and duly organized under the laws of such state and is authorized to do business in the State of North Carolina. The undersigned officer of Tenant hereby further warrants and certifies to Landlord that such officer is authorized and empowered to bind the corporation to the terms of this Lease by such officer's signature hereto; (ii) If Tenant is a general or limited partnership, the undersigned general partner of Tenant does hereby warrant and certify to Landlord that Tenant is a general partnership or limited partnership, as the case may be, validly existing under the laws of the State of North Carolina, or if formed in a state other than the State of North Carolina, is a general partnership or limited partnership validly existing under the laws of such state and is authorized to do business in the State of North Carolina. The undersigned general partner of Tenant hereby further warrants and certifies to Landlord that such general partner is authorized and empowered to bind Tenant to the terms of this Lease by such general partner's signature hereto. (iii) Landlord confirms that those persons signing below on its behalf are duly authorized to do so.

(p) The provisions of any Exhibits referenced herein, whether or not attached hereto, are incorporated herein by reference and made a part of this Lease.

(q) Although the printed provisions of this Lease were drafted by Landlord, such fact will not cause this Lease to be construed either for or against Landlord or Tenant.

(r) This Lease may not be recorded. Upon the request and at the expense of Tenant, Landlord will execute a memorandum of this Lease suitable for recording which will omit the financial terms herein but which will identify the Premises, the Parties, and the term of this Lease. Upon the expiration of this Lease, a recorded memorandum of this Lease may be canceled of record by a document executed by Landlord, or its successor in interest for such purpose.

(s) Tenant will provide to Landlord within ninety (90) days of the close of its fiscal year, and thereafter within ten (10 business days of the reasonable request of Landlord, but no more than once per calendar year except during any default or event of default by Tenant when this limitation shall not apply, financial statements of Tenant (consisting of summarized profit and loss statement, balance sheet, and cash flow statement) certified by the chief financial officer of Tenant.

(t) No remedy conferred herein is intended to be exclusive of any other remedy and each and every remedy will be cumulative and will be in addition to every other remedy given hereunder or thereunder or now or hereafter existing at law or in equity or by statute or otherwise.

(u) [INTENTIONALLY DELETED.]

(v) Tenant, its employees, and invitees shall have access to the Premises twenty-four (24) hours a day, seven (7) days a week.

(w) The provisions of this Lease and any information regarding Landlord, including its construction process, and the materials and standards used, will be maintained confidential by Tenant, its agents, employees, officers, and legal and tax advisors.
(x) Tenant shall be responsible for all ad valorem taxes on its personal property and on the value of the leasehold improvements to the extent that such improvements do not constitute fixtures, or additions or improvements to real property (as reasonably documented by Landlord). Tenant, within thirty (30) days of receipt of an invoice, shall also pay to Landlord all sales or use taxes or excise taxes imposed or levied by the State of North Carolina or any other governmental body or agency, if any, against any rent or any other charge or payment required hereunder to be made by Tenant to Landlord.
(y) This Lease does not grant any rights to light, view or air over adjacent property, and any diminution or shutting off of light, view or air by any structure that may be erected adjacent to the Building shall not affect this Lease or impose any obligation or liability upon Landlord.
(z) In coordination with the General Contractor and Landlord's Construction Manager and in compliance with the procedures required for them, Tenant shall be permitted reasonable access to the Premises prior to the Commencement Date for the purposes of taking measurements, making plans, installing trade fixtures, and doing such other work as may be appropriate or desirable to enable Tenant to assume possession of and operate in the Premises; provided, however, that such access does not unreasonably interfere with or delay construction work on the Premises and if Tenant shall unreasonably interfere with or delay construction work on the Premises, Landlord shall have the right to deny the Tenant access to the Premises. Prior to any such entry, Tenant shall comply with all insurance provisions of the Lease. All waiver and indemnity provisions of the Lease shall apply upon Tenant's entry onto the Premises.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the parties hereto have duly executed this Lease as of the day and year first set forth above.

LANDLORD:

VENABLE TENANT, LLC

By: SCIENTIFIC PROPERTIES, LLC

By: /s/ Barbra Rothschild Date: 7/6/10
Barbra Rothschild, Manager

TENANT:

PRECISION BIOSCIENCES, INC.

By: /s/ Todd Melby Date: 4-2-10
Todd Melby, Chief Financial Officer / Chief Operations Officer

EXHIBIT A

THE LAND

BEGINNING at an existing PK nail in the western right of way of Pettigrew Street (100' public r/w) and the eastern right of way of Roxboro Street, thence running south along said western right of way along the arc of a circular curve with a radius of 2125.0 feet, a chord length of 52.03 feet, subtended by a chord that bears S 42º37'26"E, for an arc length of 52.04 feet to an existing iron pipe, thence continuing along said right of way along the arc of a circular curve with a radius of 2125.0 feet, a chord length of 124.74 feet, subtended by a chord that bears S40º30'08"E, for an arc length of 124.76 feet to an existing PK nail, being the northwestern corner of Durham Foundry & Machine property, thence running along said property S45º24'44"W for a distance of 175.48 feet to an existing iron pipe, thence continuing with said property S41'05'06"E for a distance of 71.0 feet to an iron pipe set, thence continuing with said property N47º22'04"E for a distance of 30.62 feet to an iron pipe set, thence continuing with said property S41º29'07"E for a distance of 60.52 feet to an iron pipe set, thence continuing with said property N52º25'05"E for a distance of 133.09 feet to an existing PK nail in the western right of way of Pettigrew Street, thence running along said right of way along the arc of a circular curve with a radius of 2125.0 feet, a chord length of 81.56 feet, subtended by a chord that bears S33'40'35"E, for an arc length of 81.57 feet to an existing iron pipe, thence running S50º19'45"W for a distance of 151.69 feet to an existing iron pipe, thence running S41º34'48E for a distance of 79.86 feet to an existing iron pipe, thence running along the western 30 foot Ingress/Egress Easement with Hendrick Automotive Group S35º06'35"W for a distance of 119.31 feet to an iron pipe set, thence running with the northern property line of Thomas and Howard of Greensboro N42º54'51"W for a distance of 48.93 feet to an iron pipe set, thence continuing with said property N64º41'55"W for a distance of 246.14 feet to an existing iron rod, thence continuing with said property N64º35'38"W for a distance of 94.86 feet to an existing iron rod in the eastern public right of way of Roxboro Street, thence along said right of way N26º54'18"E for a distance of 99.65 feet to an existing iron rod, thence continuing with said right of way N26º35'12"E for a distance of 39.07 feet to an existing iron pipe, thence continuing with said right of way N29º23'01"E for a distance of 96.73 feet to an existing PK nail, thence continuing with said right of way N28º09'00"E for a distance of 207.93 feet to an iron pipe set, thence running N81º39'58"E for a distance of 14.62 feet to an existing PK nail, the place and point of BEGINNING for the 'Main Parcel' and containing117,484 square feet or 2.697 acres, more or less, and being all of the Main parcel of West Property, as appears on map captioned "As- Built Survey of West Property, Pettigrew Street Partners, L.L.C."

BEGINNING at an iron pipe in the western right of way of Pettigrew Street (100' public r/w) and the northeastern corner of the 'Main Parcel' of West Property, thence running with the right of way of Pettigrew Street along the arc of a circular curve with a radius of 2125.00 feet, a delta angle of 03º09'36" for an arc length of 117.20 feet, subtended by a chord that bears S30º59'49"E to an existing iron pipe, thence running along the Hendrick Automotive Group property S52º56'13"W for a distance of 128.22 feet to an iron pipe set, thence running along the western 30 foot Hendrick Automotive Group Ingress/Egress Easement N45º46'23"W for a distance of 30.37 feet to an existing iron pipe, thence running along the property line of the 'Main Parcel' of West Property N41º34'48"W for a distance of 79.86 feet to an existing iron pipe, thence continuing with said property line N50º19'45"E for a distance of 151.69 feet to an existing iron pipe, the place and point of BEGINNING for the 'Hatched Parcel' and containing 15,963 square feet or 0.366 acres, more or less, and being all of tract 2 West Property, as appears on map captioned "As- Built Survey of West Property, Pettigrew Street Partners, L.L.C."

EXHIBIT B
FLOOR PLAN

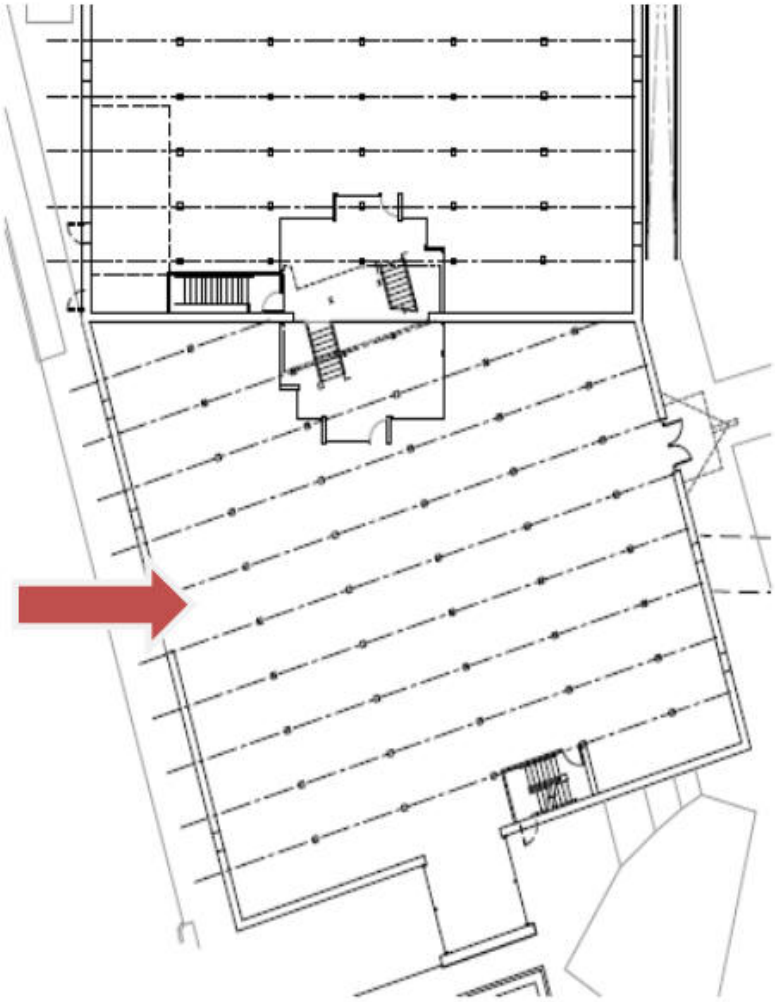


EXHIBIT C
PREMISES SPECIFICATIONS

FLOORS

Existing flooring consists of pine planking and or ¾" sub-flooring installed to provide accessibility for plumbing and electrical rough-ins. Additional sub-flooring required to accommodate Tenant Improvements shall be funded from the Tenant Improvement Allowance.

Any demolition of existing flooring required to accommodate Tenant Improvements shall be funded from the Tenant Improvement Allowance.

WALLS, DOORS & WINDOWS

Common area walls shall consist of hollow metal frames, single pane glazing, and gypsum assemblies (painted or wall covering) typical throughout the Venable campus.

All masonry construction/repair is per approved sand blasted and clear finish sealer method. Repairs or replacement of brick as required will be made using existing salvaged brick or new brick to match existing. New mortar is to match existing.

Interior corridor doors opening onto Common Areas will be stained birch veneer doors per the Venable Campus Standard. Landlord reserves the right to substitute alternate commercial grade materials. All door locksets will be coded and/or keyed in accordance with the building requirements. Codes and/or keys are to be delivered to tenant properly tested and/or tagged.

Exterior perimeter windows will be ½" insulated clear glass in black hollow metal and steel frames.

Landlord shall provide for demolition of any existing interior walls.

CEILING

The ceiling is the existing, historic, natural heart pine. Any exposed ceilings will be sealed by Landlord in accordance with best practices.

PLUMBING

All piping and fixtures within the Tenant Improvements shall be funded from the Tenant Improvement Allowance. The Landlord shall provide water and standard DWV to and from the space. Any additional piping (specialty water or waste) shall be installed from the Tenant Improvement space to the closest source/sewer, and this piping would be funding from the Tenant Improvement Allowance.

HVAC

Premises will be conditioned to office load standards by a rooftop Trane (or equivalent) zoned systems thru rated vertical chases (to lower floors only). All rooftop units to include minimum fresh air settings for anticipated office load occupancy levels. HVAC controls to be located in tenant space with single zone distribution. Additional cooling or ventilation requirements will be funded from the Tenant Improvement Allowance. HVAC distribution within the tenant space and additional control zones shall be funded from the Tenant Improvement Allowance.

ELECTRICAL CAPACITY

Building load is calculated on approximately 2 watts per square foot for the base building and approximately 2 watts per square foot for usable tenant space per typical office demand. Electrical service and meter shall be provided to a subpanel within the tenant space. The subpanel, circuit distribution (conductors and raceways), and fixtures shall be funded from the Tenant Improvement Allowance. Voice and Data Conduits will be provided within interior walls and will be funded from the Tenant Improvement Allowance. The Tenant shall contract directly with a voice/data contractor who will provide and pull cables to the Building Telecommunications Room. The Tenant's voice/data contractor will provide and terminate devices and related equipment. The voice/data contractor and any security work shall not be funded from the Tenant Improvement Allowance.

FIRE

Wet pipe sprinkler system based on ordinary hazard NFPA 13 design with upright heads.
Adjustment of sprinkler heads specific to Tenant Improvements shall be funded from the Tenant Improvement Allowance.

A building standard fire alarm and security system shall be installed and funded from the Tenant Improvement Allowance.

[END OF EXHIBIT C]

EXHIBIT D

WORK LETTER

This Exhibit D sets forth the rights and obligations of Landlord and Tenant with respect to the construction of the improvements to the Premises as described on the Plans ("Tenant Improvements"). This Exhibit contemplates that the following work will be performed, as further described herein, all subject to the prior review and approval by Landlord: (i) preparation of a space plan by the Architect; (ii) final design and engineering and preparation of plans, specifications, and working drawings by the Architect (collectively, the "Plans"); (iii) preparation by the general contractor of Landlord (the "General Contractor") of an estimate of the cost of the Tenant Improvements; (iv) submission to, and approval of Plans by, appropriate governmental authorities; and (v) construction and installation of the Tenant Improvements by the Landlord pursuant to the Plans on or prior to the Commencement Date, subject to Force Majeure and any Tenant Delay.

1. Allowance/Payment of Construction Costs.

(a) Landlord shall construct the Tenant Improvements in accordance with a milestone schedule (the "Schedule"), a copy of which shall be provided to Tenant for Tenant's reasonable approval prior to commencement of construction of the Tenant Improvements. Landlord and Tenant shall prepare and mutually and reasonably approve a budget (the "Budget") for the costs to construct the Tenant Improvements (the "Construction Costs") which shall be attached hereto as Exhibit D-3. The Budget does not include any amounts for furniture, fixtures (other than lighting), equipment, voice/data systems, or personal property of Tenant, which items will be paid for by Tenant separately at its expense. The Budget includes a Construction Contingency which shall be 5% of the Construction Costs. Any unspent Construction Contingency will accrue to the Tenant. Change Orders (as hereinafter defined) shall be funded from increases in the Contract (as hereinafter defined). Landlord agrees to fund a portion of the Construction Costs through the provision of the Tenant Improvement Allowance. The Tenant Improvement Allowance shall be used for items specifically outlined in the Budget and mutually agreed upon by both Landlord and Tenant. The Tenant Improvement Allowance shall be used only for construction, design, and management costs related to fixed improvements to the Building that are part of the Tenant Improvements. The Tenant Improvement Allowance may not be used to offset any Rent payments owed to Landlord by Tenant. Any costs incurred due to a Tenant Delay shall be charged against the Tenant Improvement Allowance; provided, however, Tenant shall be given two (2) days' notice and opportunity to cure any Tenant Delay (including payment by Tenant of any costs associated with such cure such as higher shipping charges) before any costs are charged against the Tenant Improvement Allowance. Landlord and Tenant acknowledge and agree that the Construction Costs will be in excess of the Tenant Improvement Allowance, and all costs for the Tenant Improvements in excess of the Tenant Improvement Allowance shall be borne by Tenant. Therefore, Tenant has agreed to place into an escrow account maintained with Landlord (the "Escrow Account") an amount equal to the Construction Costs as specified in the Budget minus the Tenant Improvement Allowance (the "Tenant Improvement Overage"). Landlord shall

establish the Escrow Account as a separate, interest bearing account in an FDIC insured institution. set forth below, Landlord shall have the authority to make periodic deductions from the Escrow Account as payment for the Construction Costs and the Escrow Account shall be funded in full by Tenant prior to Landlord's issuance of a Notice to Proceed to the General Contractor. Failure by Tenant to deposit the Tenant Improvement Overage into the Escrow Account within five (5) business days after a request from Landlord hereunder shall be a Tenant Delay and a default in payment hereunder. Tenant shall receive all interest that accrues under the Escrow Account.

(b) The Tenant Improvement Allowance and Tenant Improvement Overage shall be disbursed by Landlord upon satisfaction of the following conditions precedent: (i) Landlord shall have received applications for payment certified by the Architect, accompanied by evidence of the portion of the Tenant Improvements that have been completed per the Plans, invoices and paid receipts for all such work completed, and copies of executed lien waivers from those persons providing such work; and (ii) all information and documentation provided to Landlord must be in form and substance reasonably approved by Landlord. Upon Tenant's request, Landlord shall provide Tenant an opportunity to review such information and documentation.

(c) Provided the aforesaid conditions are met, Landlord shall pay the Construction Costs at monthly intervals based upon design and construction billing cycles. Each monthly payment of the Construction Costs shall be paid as follows: fifty percent (50%) of such payment shall be paid from the Tenant Improvement Allowance and the remaining fifty percent (50%) of such payment shall be paid from the Tenant Improvement Overage through the Escrow Account. Within thirty (30) days after the Commencement Date, Landlord shall prepare and submit to Tenant a final statement that illustrates the total cost to construct the Tenant Improvements and the amount paid from and remaining with respect to each of the Tenant Improvement Overage as held in the Escrow Account, and the Tenant Improvement Allowance. If such statement indicates that Landlord has paid less than the total amount of the Tenant Improvement Allowance, then Landlord shall pay Tenant an amount equal to the Tenant Improvement Allowance minus the total amount previously paid by Landlord within ten (10) days of the date of such statement. If such statement reflects that the amount deposited into Escrow Account by Tenant as the Tenant Improvement Overage was greater than the amount required to be paid by Tenant, then Tenant shall be entitled to a prompt refund of any such amounts.

(d) Unless otherwise specified in the Plans, materials used for the Tenant Improvements at the Building shall be good quality, new, and customary for the type of upfit contemplated in this Lease and in facilities comparable to the Building and readily available in the market where the Building is located, all as reasonably determined by Landlord.

(e) During construction of the Tenant Improvements, Landlord shall provide weekly written progress reports to Tenant necessary for Tenant to review work schedules, costs, expenses and construction issues regarding the construction of the Tenant Improvements. The parties will hold periodic meetings, at mutually agreed upon times and locations, to discuss the progress of the construction of the Tenant Improvements. The General Contractor will provide an updated Budget, Schedule, and RFI log every two weeks during construction of the Tenant Improvements. The General Contractor and Landlord reserve the right to cure self imposed delays in the Schedule.

(f) Should a default or event of default occur by Tenant hereunder prior to the Commencement Date, Landlord shall have the right to cease all construction of the Tenant Improvements, and pursue all of its rights and remedies hereunder, or available at law or in equity for any such default or event of default.

2. Space Planning, Design and Working Drawings. Tenant shall engage Integrated Design (the "Architect") to prepare the Plans. After execution of this Lease, Tenant may seek reimbursement from the Tenant Improvement Allowance for fees paid to the Architect. The Architect's fees shall be paid from the Tenant Improvement Allowance by Landlord upon receipt and approval by Landlord of invoices and lien waivers for work performed. Belk Architecture or another architect with historic tax credit expertise (the "Landlord's Architect") shall review the Plans to insure compliance with the requirements of State and Federal law for historic tax credits and all the costs for such review shall be borne by Landlord. If the Landlord's Architect identifies any changes that must be made to the Plans solely for the purposes of complying with requirements for historic tax credits, the costs of designing and constructing such changes shall be borne by Landlord provided there has been no material deviation from the Plans attached as Exhibit D-1. Tenant shall review and respond to any request for approval of the draft plans or final Plans (by U.S. Mail, facsimile, or email) within five (5) business days after a request from either the Architect or Landlord. Any modifications of the Plans sought by Tenant shall be reviewed and subject to the approval of Landlord prior to the modification of the Plans. All communication by Tenant to Landlord with respect to the Tenant Improvements shall be in writing. Tenant shall designate an Authorized Representative to work with Landlord with respect to the Tenant Improvements, and Landlord shall not be obligated to respond to any instructions, approvals, changes, or other communications from anyone claiming to act on Tenant's behalf other than Tenant's Authorized Representative. Review and approval by Landlord of the Plans shall not be construed as any statement by Landlord as to the compliance of the Plans with Applicable Laws.

3. Construction of Tenant Improvements. Landlord shall obtain all state and local licenses, permits and approvals (whether governmental or non-governmental) required to construct the Tenant Improvements and for Tenant's occupancy of the Premises. Landlord shall provide access to the General Contractor for Construction of the Tenant Improvements and to the extent such access requires entry through space occupied by other tenants, Landlord shall provide for such access at its sole cost and expense. The Landlord shall engage, subject to Tenant's reasonable approval, a general contractor to construct the Tenant Improvements (the "General Contractor"). The General Contractor shall construct and install the Tenant Improvements in accordance with the Plans which expense shall be deducted from the Tenant Improvement Allowance. The Tenant Improvements shall be delivered via Associated General Contractors (AGC) Guaranteed Maximum Price Contract (the "Contract") with Liquidated Damages of $500.00 per day for each day of delay in achieving in substantial completion beyond the date specified in the Contract, which date shall be no later than October 1, 2010, and a payment and performance bond. Any Liquidated Damages (less cost of collection) paid to Landlord shall accrue to the Tenant; provided, however, any paid Liquidated Damages for any Tenant Delay shall accrue to Landlord. The General Contractor shall obtain at least three (3) bids for all major trade work at the Premises. Landlord will work with the General Contractor to complete the Tenant Improvements by the Commencement Date. All contracts with vendors and subcontractors for construction of the Tenant Improvements will be negotiated by the General Contractor. All work performed in

connection with the construction of the Premises shall be performed in a good and workmanlike manner, in accordance with all Applicable Laws and the final approved Plans. If materials are not readily available, require quick ship charges, or require substitution, the Tenant will be given notice and the opportunity to select alternate materials. Landlord shall insure that the Architect conducts a periodic review (a minimum of once every two weeks) of the progress of construction to ensure compliance with the Plans. Tenant may from time to time request in writing changes to the Plans (a "Change Order"), subject to Landlord's consent, which shall not be unreasonably withheld. Landlord shall cause Contractor to provide an estimate of any change in the Construction Cost and/or Schedule. Tenant shall have the right to elect whether or not to proceed with the Change Order within five (5) business days after receipt of such estimate. Upon such approval by Tenant, or confirmation by Landlord that the Change Order will not result in any change in cost and/or Schedule, Landlord shall implement the Change Order as part of the Tenant Improvements.

Tenant acknowledges that the following items may result in changes to the Budget and/or Schedule:

(i) Municipal or other governmental inspectors require changes to the Premises such as code compliance changes. In such event, Landlord will notify Tenant of the required changes, but the increased cost of such changes, if any, and any delay associated with such changes shall be the responsibility of Tenant.

(ii) Change Orders approved by Tenant. Any increased costs and delays due to such approved Change Orders shall be the responsibility of Tenant. Any delays caused by such approved Change Orders shall not delay the Commencement Date of the Lease. Landlord shall not charge Tenant any administrative fees in respect of any Change Orders. Tenant shall have five (5) business days to review and approve all Change Orders and any additional review time by Tenant shall be a Tenant Delay.

(iii) If materials are not readily available, require quick ship charges, or require substitution, provided Landlord shall identify any such materials within ten (10) days of final approval of the Plans, and in any such case, Tenant will be given notice and the opportunity to select alternate materials.

(iv) Any Tenant Delay.

4. Repairs and Corrections. Landlord shall require of the General Contractor and any subcontractor constructing the Tenant Improvements no less than a one year express repair and/or replacement warranty covering such work. All manufacturers' and builders' warranties with respect to the Tenant Improvements shall be assigned to Tenant to the extent possible and necessary to assist Tenant in effecting any of Tenant's repair obligations under the Lease without recourse to Landlord. Landlord agrees to enforce for the benefit of Tenant any warranties or guarantees issued in connection with construction of the Tenant Improvements. Tenant shall repair or correct any defective work or materials installed by Tenant or any contractor other than the General Contractor (except subcontractors engaged by the General Contractor), or any work or materials that prove defective as a result of any act or omission of Tenant or any Tenant Party, provided that selection of materials by Tenant is not such an act or omission, and provided further that work and materials done or installed by the General Contractor or its vendors and subcontractors is not such an act or omission. For purposes of this Section, Landlord will not be considered to be Tenant's agent, invitee, licensee, subtenant, customer, client, or guest.

5. Punchlist. Landlord shall provide Tenant with written notice when Landlord believes that substantial completion of the Tenant Improvements has been achieved. Promptly following delivery of such notice, Tenant's Representative and Landlord's Representative shall jointly inspect the Tenant Improvements, and, Landlord and Tenant shall mutually and reasonably prepare a punchlist of items remaining with respect to the Tenant Improvements that require repair or completion (the "Punchlist"). Pursuant to its Contract with Landlord, General Contractor shall make all repairs and completions noted on the Punchlist with respect to the Tenant Improvements within forty-five (45) days (extended for Force Majeure and any Tenant Delay) after receipt of the Punchlist, with any Liquidated Damages paid by the General Contractor for a delay in completion of the Punchlist accruing to the benefit of Tenant. Landlord acknowledges and represents that the Contract will include liquidated damages for delays in final completion (including completion of Punchlist items) in the amount of at least $150.00 per calendar day of delay in completing the Punchlist repairs beyond the time provided in this paragraph.

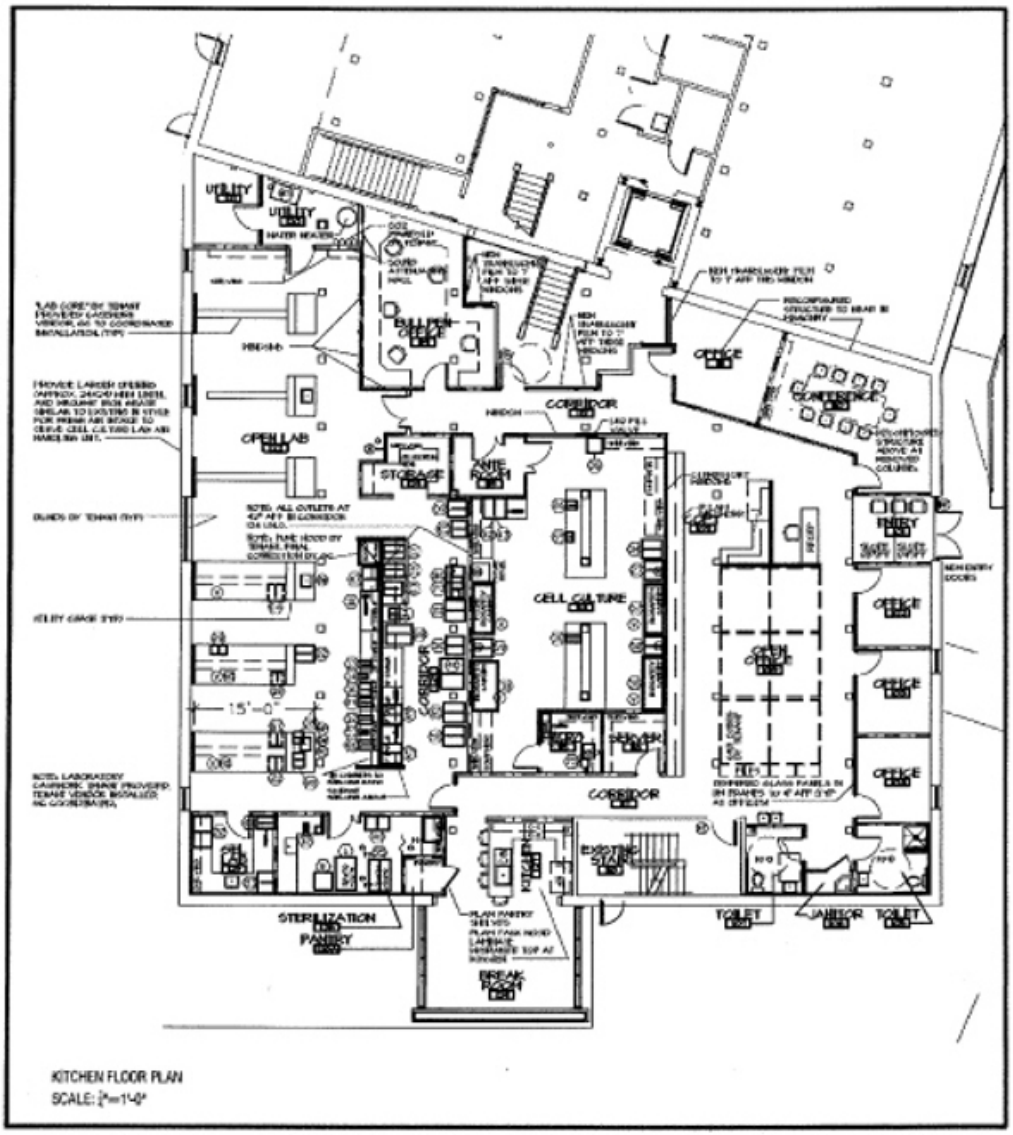
6. Move-In by Tenant. Tenant shall schedule its move into the Premises with Landlord prior to occupying any portion of the Premises.

7. Tenant Representative. Whenever Landlord or any contractor responsible for the Tenant Improvements shall need to communicate with Tenant about the Tenant Improvement related matters, including Change Orders, Landlord or such contractor shall contact Todd Melby at todd.melby@precisionbiosciences.com or (330) 329-4015.

8. Landlord Representative. Whenever Tenant or any contractor responsible for the Tenant Improvements shall need to communicate with Landlord about the Tenant Improvement related matters, including Change Orders, Tenant or such contractor shall contact Steven Hess at steven.hess@scientificproperties.com, or (919) 600-3435.

EXHIBIT D-1

PRELIMINARY PLANS



Integrated Design
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Fax: 919.839.2255
www.id-aep.com
ARCHITECTS • ENGINEERS • PLANNERS

JOB CODE: VENPB
DATE: 26MAR2010

DRAWING NUMBER
CC-10

INTERIOR COMPLETION FOR:
PRECISION BIOSCIENCES
THE VENABLE CENTER - DIBRELL BUILDING
302 E. PETTIGREW STREET, SUITE 100A, DURHAM, NC
WITHIN FORMER HISTORIC WAREHOUSE BUILDING, SOUTH BAY

EXHIBIT D-2

FINAL PLANS

[TO BE ATTACHED UPON THE MUTUAL AND REASONABLE APPROVAL OF LANDLORD AND TENANT]

EXHIBIT E

RULES AND REGULATIONS

1. Building holidays are New Year's Day, Martin Luther King, Jr. Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day.

2. The sidewalks, common areas, and public portions of the Building and Project, such as entrances, passages, courts, elevators, vestibules, stairways, corridors or halls, and the streets, alleys or ways surrounding or in the vicinity of the Building or Project will not be obstructed by Tenant, even temporarily, or encumbered by Tenant or used for any purpose other than ingress to and egress from the Premises.

3. No awnings or other projections will be attached to the outside walls of the Building.

4. No sign, advertisement, notice or other lettering will be exhibited, inscribed, painted or affixed by Tenant on any part of the outside of the Premises or Building unless approved by Landlord (in accordance with the Lease). Signs on entrance doors will, at Tenant's expense, be inscribed, painted or affixed for each tenant by sign makers reasonably approved by Landlord. In the event of the violation of the foregoing by Tenant, Landlord may remove same without notice to Tenant or any liability therefore, and may charge the expense incurred by such removal to Tenant.

5. The sashes, sash doors, skylights, windows, heating, ventilating and air conditioning vents and doors that reflect or admit light and air into the halls, passageways or other public places in the Building will not be covered or obstructed by Tenant.

6. No show cases or other articles will be put in front of or affixed to any part of the exterior of the Building, nor placed in the public halls, corridors, or vestibules without the prior written consent of Landlord.

7. The bathrooms and plumbing fixtures will not be used for any purposes other than those for which they were designed, and no sweepings, rubbish, rags, or other substances will be thrown therein. All damages resulting from any misuse of the bathrooms or fixtures will be the responsibility of Tenant.

8. Tenant will not in any way deface any part of the Premises or the Building.

9. No vehicles or animals of any kind, except leashed animals, and animals assisting disabled persons or used for laboratory purposes, will be brought into or kept in or about the Premises or in the Building except that vehicles may be parked and stored in designated areas; provided, however, only animals assisting disabled persons shall be allowed in areas of the Building other than the Premises, Landlord shall have no liability to Tenant or any Tenant Party with respect to the presence of animals at the Project as permitted by Tenant or any Tenant Party, and Tenant shall indemnify, defend and hold harmless Landlord of, from and against all loss, liability cost, or expense incurred by Landlord or any Landlord Party due to the presence of animals at the Project as permitted by Tenant or a Tenant Party. No cooking will be done or permitted by Tenant on the Premises except in conformity with all Applicable Laws and then

only in the area designated as a kitchen, if any, on the Premises of Tenant which is to be primarily used by Tenant's employees for preparing their food and beverages while within the Premises. Tenant will not cause or permit any unusual or objectionable odors to be produced upon or permeate from the Premises.

10. All desks will be serviced by chairs with rollers that are equipped with floor mats underneath each chair in carpeted areas.

11. No space in the Building will be used for the sale of merchandise, goods, or property of any kind at auction except in the ordinary course of business of Tenant.

12. Tenant will not make, or permit to be made, any unseemly or disturbing noises or unreasonably disturb or interfere with occupants of the Building or neighboring buildings or premises or those having business with them, whether by the use of any musical instrument, radio, talking machine, unmusical noise, whistling, singing, or in any other way. Tenant will not throw anything out of the doors, windows or skylights or down the passageways.

13. Except in accordance with the Lease, neither Tenant, nor any Tenant Party will at any time bring or keep upon the Premises any inflammable, combustible or explosive fluid, or chemical substance, other than reasonable amounts of cleaning fluids or solvents required in the normal operation of Tenant's business offices and reasonable amounts of butane or similar "cigarette" lighters.

14. No additional locks or bolts of any kind will be placed upon any of the doors, walls, access-ways, or windows by Tenant, nor will any changes be made in existing locks or the mechanism thereof, without the prior written approval of Landlord and unless and until a duplicate key or access card, as applicable, is delivered to Landlord. Tenant will, upon the termination of its tenancy (i) return to Landlord all keys for the Premises and for any area of the Building, or common areas, either furnished to, or otherwise procured by Tenant, (ii) restore the locks, walls, access-ways, windows, and doors to their original condition on the date of this Lease by removing any security measures installed by Tenant, repairing any damage to the Premises or to the Building as a result of the restoration and removal, and (iii) in the event of the loss of any keys furnished to Tenant by Landlord, Tenant will pay to Landlord the cost thereof.

15. Tenant will not overload any floor.

16. Tenant will not occupy or permit any portion of the Premises to be used for the possession, storage, manufacture or sale of liquor, narcotics, or tobacco in any form.

17. Tenant will be responsible for all persons for whom it issues passes and/or keys and will be liable to Landlord for all acts of such persons.

18. The Premises will not be used for lodging or sleeping.

19. The requirements of Tenant will be attended to only by Landlord or the property manager of the Premises.

20. Canvassing, soliciting, and peddling in the Building are prohibited and Tenant will cooperate to prevent the same.

21. All paneling, and other wood products not considered furniture will be of fire retardant materials.

22. No smoking is permitted in the Premises, in the Building, on the Project or on the Land.

23. No weapons concealed or visible are permitted in the Premises, in the Building, or on the Land.

24. In the event the Premises constitute an outdoor patio, exterior generator area, or any open area adjacent to the Premises or on the Land designated under the Lease for the exclusive use of Tenant, Tenant will use furniture and other equipment in any such areas in form, coloring, substance, design and quality subject to the prior approval of Landlord (not to be unreasonably withheld, or delayed). In addition, any outdoor patio, exterior generator area, or other open area must be screened on all sides using materials in form, substance, coloring, design, and quality are subject to the prior approval of Landlord (not to be unreasonably withheld, or delayed), and must be designed and constructed in accordance with plans and specifications that are subject to the prior approval of Landlord (not to be unreasonably withheld, or delayed).

Whenever the above rules conflict with any of the rights or obligations of Tenant pursuant to the provisions of the Lease, the provisions of the Lease will govern. Landlord will not be responsible to Tenant or liable for the non-observance or violation of any of these Rules and Regulations by any other tenant.

EXHIBIT F

TENANT SECURITY PROCEDURES

Precision BioSciences Security Protocol:

Guests:

Invited guests are welcome at Precision BioSciences. All guests must sign into the guest log at the front desk when entering the premises. They will receive a visitor pass from the Executive Assistant which is to be displayed at all times while in the premises.
During their visit, guests must be escorted at all times. While in lab areas, all guests must wear lab coats and safety glasses. Photographs or videos are not allowed unless permission has been granted by an employee. Cell phone use is to be restricted to areas outside of the laboratories and preferably in an office or the conference room.
Upon exit, guests must sign out and return the visitor pass.

EXHIBIT G

LIST OF HAZARDOUS MATERIALS

Exhibit G

Number	Item	Amount	Section	Class	Location
1	Ethanol	5gal	Flammable Liquid	Class IB	Open Lab
2	Isopropanol		Flammable Liquid	Class IB	Open Lab
3	2-Mercaptoethanol	100ml	Combustible	Class IIIA	Open Lab
			Highly Toxic		
4	Acetic Acid	2L	Combustible	Class II	Open Lab
			Corrosive		
5	Adenine	20g	Toxic		Open Lab
6	Buffer N3	4gal?	Combustible	Class II	Open Lab
7	Buffer PB	4gal?	Combustible	Class II	Open Lab
8	Buffer PM	2gal?	Combustible	Class II	Open Lab
9	Buffer QBT	0.5gal?	Combustible	Class II	Open Lab
10	Buffer QC	0.5gal?	Combustible	Class II	Open Lab
11	Buffer QF	0.5gal?	Combustible	Class II	Open Lab
12	Butane		Flammable Gas		Open Lab
			Aerosol		
13	Coomassie Stain	1L	Flammable Liquid	Class IB	Open Lab
14	Dimethyl Sulfoxide	200ml	Combustible	Class IIIB	Open Lab
15	Formaldehyde	500mL	Combustible	Class IIIA	Open Lab
			Toxic		
16	Hydrochloric Acid	2L	Corrosive		
17	Imidazole	25g	Toxic		
			Corrosive		
18	Methanol	4L	Flammable Liquid	Class IB	Open Lab
19	Phenol	250ml	Combustible	Class IIIA	Open Lab
			Toxic		
20	Phenol-Chloroform	50ml	Combustible	Class IIIA	Open Lab
			Toxic		
21	Protein G - Sepharose	5mL	Combustible	Class II	Open Lab
22	Sodium Acetate (3M)	100mL	Combustible	Class IIIB	Open Lab
23	Sodium Dodecyl Sulfate	30g	Flammable Solid		Open Lab
			Toxic		
24	Sodium Hydroxide	650g/10ml	Corrosive		Open Lab
25	Triton X-100	500ml	Combustible	Class IIIB	Open Lab
26	Xylene Cyanide	5g	Combustible	Class IIIB	Open Lab

FIRST AMENDMENT TO THE LEASE AGREEMENT

THIS FIRST AMENDMENT TO LEASE AGREEMENT (the "Amendment") is made and entered into as of the 19th day of August, 2011 by and between VENABLE TENANT, LLC, a North Carolina limited liability company (the "Landlord"), and PRECISION BIOSCIENCES, INC., a Delaware Corporation (the "Tenant").

WITNESSETH:

WHEREAS, pursuant to that certain Lease Agreement dated April 5, 2010 by and between Landlord and Tenant (the "Lease"), Tenant leased certain premises located in the Dibrell A Warehouse Building at 302 East Pettigrew Street, Durham, North Carolina (the "Building") and consisting of approximately 8,274 rentable square feet, as more particularly described in the Lease (the "Premises"); and

WHEREAS, the parties desire to modify the Lease as provided herein.

NOW, THEREFORE, in consideration of cash in hand paid and the promises and the provisions contained herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Landlord and Tenant hereby agree to amend and modify the Lease as follows:

1. Roof Access.

(a) Tenant has requested and Landlord has agreed that Tenant, its agents, employees, and independent contractors (all of the foregoing, together with Tenant shall be referred to herein collectively, as the "Tenant Parties" or each as a "Tenant Party") may have access to the roof of the Building (the "Roof") provided that Tenant complies with the following terms and conditions:

(i) Tenant shall maintain insurance against loss or damage to person (including death) or property due to any act or omission of any Tenant Party in connection with the access of the Roof and conduct of work thereon;

(ii) The sole purpose for access by a Tenant Party to the Roof is the repair, maintenance and replacement of HVAC units, and/or generators owned by Tenant and located on the Roof;

(iii) To the extent caused by a Tenant Party's access to the Roof or conduct of work thereon, Tenant shall promptly repair any damage to the Roof, or any property of Landlord or of any other tenant of the Building located thereon caused by Tenant Party. Landlord reserves the right to make said repairs, at the sole expense of the Tenant, if Tenant repairs do not occur in a timely fashion or in the event other Tenants of the building are negatively impacted as a result of the repair timing and Tenant shall remit payment to the Landlord of its actual and reasonable costs incurred in effecting any such repairs within ten business days after demand made by Landlord and documentation of Landlord's costs provided to Tenant therefore;

(iv) Landlord shall have the right to limit access by Tenant to the Roof in the event of an emergency or other circumstance that requires such limitation;

(v) No act or omission by a Tenant Party shall result in penetration of the membrane of the Roof; and

(vi) Tenant shall comply with all Applicable Laws (as defined in the Lease) in connection with its access to the Roof and conduct of work thereon.

(b) Notwithstanding any provision of this Amendment to the contrary, if any Tenant Party shall fail to comply with the terms and conditions stated herein, Landlord may terminate the right of Tenant to access the Roof upon ten (10) days prior written notice to Tenant specifying the reason for such termination.

(c) Tenant acknowledges on behalf of each Tenant Party that there are no walls, railings, barriers, or other structures on the edges of the Roof (defined as the "Roof Condition"), and understands the potential danger and risk associated with its entry thereon, and Tenant acknowledges that Tenant is not aware of any obligation Landlord has to modify the Roof Condition existing as of this date.

(d) Landlord shall not be liable and Tenant hereby remises, releases and forever discharges Landlord, and its owners, directors, members, shareholders, members, managers, affiliates, partners, officers, insurers, agents (including, but not limited to, the property manager of Landlord, Scientific Properties, LLC), accountants, employees, attorneys, and assigns of and from any and all claims resulting from a Tenant Party's breach of the terms of this Amendment. Tenant shall indemnify, defend and hold Landlord harmless from and against any and all loss, liability, damages (including, but not limited to personal injury, death, or property damage), costs, expenses, and attorneys' fees incurred by Landlord arising from (i) any breach by a Tenant Party of this Amendment; or (ii) any entry by a Tenant Party upon the Roof, unless any such loss, liability, damages (including, but not limited to, personal injury, death or property damage) is due to a breach by Landlord of this Amendment.

2. Acknowledgement. Landlord acknowledges and agrees that nothing in this Amendment shall limit Landlord's obligation to maintain and repair the Roof and the Building pursuant to Sections 7 and 10 of the Lease for any maintenance and/or repairs not resulting from damage by a Tenant Party.

3. Severability. In the event any term, covenant or condition of this Amendment, the Lease, or any amendments thereto shall to any extent be invalid or unenforceable, the remainder shall not be affected thereby and each term, covenant or condition shall be valid and enforceable to the full extent permitted by law.

4. Successors and Assigns. This Amendment shall apply to, inure to the benefit of, and be binding upon the parties hereto and upon their respective heirs, legal representatives, successors and permitted assigns, except as otherwise provided herein.

5. Authority of Parties. Each party hereto hereby certifies that it is authorized to enter into this Amendment, and that those persons signing below on its behalf are authorized to do so.

6. Full Force and Effect. Except as modified hereby, the Lease is hereby reaffirmed, unmodified and in full force and effect.

7. Governing Law. This Amendment shall be governed by and construed in accordance with the laws of the State of North Carolina.

8. Mutual Acknowledgment of Non-Existence of Claims. Except as provided herein, Landlord and Tenant acknowledge and agree that as of the day hereof there are no known claims by either party against the other party hereto arising from the relationship as Landlord and Tenant, respectively, pursuant to the Lease, as amended.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the parties hereto have hereunto executed this Amendment as of the day and year first above written.

LANDLORD:

VENABLE TENANT, LLC

By: SCIENTIFIC PROPERTIES, LLC

By: /s/ Barbra B. Rothschild
Barbra B. Rothschild, Manager

TENANT:

PRECISION BIOSCIENCES, INC.

By: /s/ Todd Melby
Print Name: Todd Melby
Its: CFO/COO

SECOND AMENDMENT TO THE LEASE AGREEMENT

THIS SECOND AMENDMENT TO THE LEASE AGREEMENT (the "Amendment") is made and entered into as of July 13, 2015 by and between VENABLE TENANT, LLC, a North Carolina limited liability company (the "Landlord"), and PRECISION BIOSCIENCES, INC., a Delaware corporation (the "Tenant").

WITNESSETH:

WHEREAS, pursuant to that certain Lease Agreement dated April 5, 2010, as amended by that certain First Amendment to Lease Agreement dated August 19, 2011, by and between Landlord and Tenant, Tenant leased certain premises known as Suite 100 in the Dibrell A Building at 302 East Pettigrew Street, Durham, NC (the Lease Agreement and all amendments thereto shall be referred to herein collectively as the "Lease"); and

WHEREAS, Tenant has requested and Landlord has agreed to modify the Lease as provided herein.

NOW, THEREFORE, in consideration of cash in hand paid and the promises and the provisions contained herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Landlord and Tenant hereby agree as follows:

1. Definition of Terms. All capitalized terms contained herein and not otherwise defined shall be defined as provided in the Lease.

2. Term.

(a) The term of the Lease currently expires on February 28, 2016. Landlord has agreed to extend the term of the Lease for a period of sixty-five (65) months (the "Extended Term") for a revised Termination Date of July 31, 2021.

(b) During the Extended Term, the Premises shall be leased by Tenant "as is" except as expressly provided herein, and subject to Landlord's continuing Lease obligations (such as repair and maintenance).

3. Premises.

(a) Tenant has requested and Landlord has agreed to an expansion of the Premises (collectively, the "Expansion Space") to include the addition of (i) approximately 8,427 rentable square feet on the second floor of the Building known as Suite 200, and (ii) approximately 2,863 rentable square feet known as Suite 30 in the building known as the Receiving Room. A floor plan of the Expansion Space is attached hereto and made a part hereof as Exhibit A.

(b) The term of the Lease for the Expansion Space shall commence upon the date that the Expansion Space is substantially complete (as evidenced by a certificate of occupancy issued by the City of Durham and certification of substantial completion by the Architect), which it is estimated shall occur on September 1, 2015 (the "Expansion Commencement Date"), and shall terminate on the revised Termination Date. On the Expansion Commencement Date, the term

"Premises" under the Lease shall include the Expansion Premises, and the term "Building" shall be deemed to include the Receiving Room Building. Notwithstanding the foregoing, upon Tenant's request and within a reasonable timeframe thereafter, Landlord shall advise Tenant if a portion of the Expansion Space (the "Early Portion") may be occupied by Tenant before the entirety of the Expansion Space is completed and Tenant shall advise Landlord if it desires to occupy the Early Portion. Early occupancy of the Early Portion shall not trigger the Expansion Commencement Date or the Expansion Rent Abatement (as defined herein) and for such occupancy, Tenant shall pay an equitable portion of the Base Rent based upon the then current rate for the Premises, and any other charges for the Early Portion (including increased charges for Operating Expenses based upon the increased Tenant's Proportionate Share), with Landlord and Tenant negotiating reasonably and in good faith to determine such charges based on the square footage of the Early Portion and the number of days Tenant occupies the Early Portion for the conduct of its business prior to the actual Expansion Commencement Date at which time, Tenant shall pay the Base Rent set forth in the Landlord's Notice (as defined herein).

(c) Effective upon the Expansion Commencement Date, Tenant's Proportionate Share of the Dibrell A Warehouse Building shall be 32.32431 percent, Tenant's Proportionate Share of the Receiving Room / Prizery Building shall be 8.41119 percent, and Tenant's Proportionate Share of the Project shall be 22.82741 percent.

4. Upfit of Expansion Space. Landlord shall provide an allowance to Tenant for its use in the upfit of the Expansion Space in an amount of up to $250,000 (the "Upfit Allowance"). The Upfit Allowance may be used by Tenant for permitting, construction, architectural and engineering costs, including, costs for cable and information technology. The manner in which Upfit Allowance is to be provided and details of construction of the upfit for the Expansion Space shall proceed per the terms of the Work Letter attached hereto and made a part hereof as Exhibit B.

5. Base Rent.

(a) Commencing upon the Expansion Commencement Date, Base Rent shall be due and payable for the portion of the Premises located in the (i) Dibrell Building of approximately 16,539 rentable square feet (Suites A-100 and A-200) at the rate of $18.50 per rentable square feet, triple-net, with a Base Annual Rent Escalation of 2.75 percent each Lease Year, and (ii) Receiving Room Building (Suite RR-30) of approximately 2,863 rentable square feet at the rate of $21.25 per rentable square feet, full service, with a Base Annual Rent Escalation of 2.75 percent each Lease Year.

(b) Provided there is no event of default under the Lease then in effect, commencing with the Expansion Commencement Date, Base Rent under the Lease shall be abated for a period of five months (the "Expansion Rent Abatement").

6. Base Year. The Base Year for the purposes of calculating Additional Rent attributable to increases in Operating Expenses for the Receiving Room, Suite 30 shall be 2016.

7. Operating Expenses. During the Extended Term, Tenant shall continue to pay Tenant's Proportionate Share of Operating Expenses as provided in the Lease, and amended hereby

for the portion of the Expansion Space located in the Dibrell Building. During 2015 and the Base Year of 2016, Tenant will not pay for Operating Expenses attributable to Suite RR-30, as the Base Rent for the Receiving Room space is a full-service rate with a 2016 base stop. In subsequent Lease Years, , Tenant will be charged for increases in Operating Expenses attributable to Suite RR-30 over and above the Base Year 2016.

8. Direct Tenant Expenses. Tenant will arrange for the provision of service and shall pay directly to each service provider all charges as follows:

a. Suites A-100 and A-200: all electricity, gas, and other utilities; janitorial, telephone and internet/data used on or from the Premises together with any taxes, penalties, surcharges, or the like pertaining thereto

b. Suite RR-30: all telephone and internet/data used on or from the Premises together with any taxes, penalties, surcharges, or the like pertaining thereto

9. Security Deposit. Section 9 of the Lease is hereby deleted and the following new Section 9 inserted in lieu thereof:

Promptly upon the full execution of this Amendment (with delivery of a copy thereof to Tenant), Tenant shall deposit the amount required to increase the Security Deposit under the Lease to $123,269.08, four months Base Rent for the Premises on the Expansion Commencement Date. Provided there is no default or event of default by Tenant under the Lease, the Security Deposit shall be reduced to (i) three months Base Rent on the first anniversary of the Expansion Commencement Date, and (ii) one month Base Rent on the second anniversary of the Expansion Commencement Date. Landlord will not be required to apply all or any portion of the Security Deposit with respect to any particular violation or default by Tenant but Landlord may apply all or any portion (as reasonably required to effect a cure) of the Security Deposit to any violation, breach, or default by Tenant hereunder. Landlord will be entitled to hold the Security Deposit in an account maintained by Landlord for such funds from all tenants of Landlord. Any interest paid on such an account will become a part of the Security Deposit, accrue to the benefit of the Tenant (less any customary bank fees or charges for maintaining such account), and be delivered to Tenant upon termination of this Lease provided that the Security Deposit and interest thereon have not been applied by Landlord to an event of default hereunder. Tenant will reimburse Landlord for such portions of the Security Deposit as Landlord will from time to time apply with respect to any violation, breach, or default by Tenant hereunder promptly upon written notice of such application by Landlord. Any portion of the Security Deposit which has not been appropriated by Landlord in accordance with the provisions hereof will be returned to Tenant within thirty (30) days after the termination of this Lease.

If Landlord conveys Landlord’s interest under this Lease, the Security Deposit, or any part thereof not previously applied, shall be released by Landlord to Landlord’s grantee (to the extent not applied to any default by Tenant hereunder), and if so released, Tenant agrees to look solely to such grantee for the proper application and return thereof in accordance with the Lease provided that Tenant receives written notice of such conveyance. Tenant agrees that Tenant will not assign, and that neither Landlord, nor its successors and assigns, will be bound by any such assignment, encumbrance or pledge, attempted assignment, attempted pledge, or attempted encumbrance of the Security Deposit.

Any mortgagee or ground lessor will not be responsible to Tenant for the return or application of the Security Deposit, whether or not it succeeds to the position of Landlord hereunder, unless the security deposit will have been received in hand by such mortgagee or ground lessor.

Any unperformed obligations of Landlord or Tenant under this Section will survive the termination of the Lease, for whatever reason, or any extension or renewal hereof.

10. Right of Refusal. Landlord hereby grants to Tenant a one-time right of first refusal to lease space in the Project (the "Refusal Space") under the terms and conditions as provided below:

(i) So long as there is no default (beyond any applicable grace and/or cure period) or event of default by Tenant under the Lease, Landlord will notify Tenant when it has all or a portion of the Refusal Space offered for lease to a third party (the "Third Party") and the terms and conditions upon which Landlord is willing to lease such space ("Landlord's Notice") .

(ii) Tenant shall provide written notice to Landlord, as to Tenant's decision to lease or not to lease the Refusal Space within ten (10) business days after Landlord's Notice is received. If Tenant does provide to Landlord notice to lease the Refusal Space, Landlord and Tenant will negotiate in good faith to agree upon an amendment to the Lease to add the Refusal Space within ten (10) business days after Landlord's receipt of Tenant's notice of intent to lease on all the same terms provided to the Third-Party. If Tenant does not provide written notice to Landlord within ten (10) business days after receipt of the Landlord's Notice, Tenant will have been deemed to have waived its right to lease the Refusal Space and Landlord shall be free to enter into a lease with the Third Party (upon substantially the same terms and conditions listed in Landlord's Notice), and Tenant shall have no further rights with respect to that particular Refusal Space within the Project.

Once Landlord has offered a specific portion of the Refusal Space to Tenant, and Tenant has not leased such specific portion under the terms and conditions provided in this Section, Tenant shall have no further right to such specific portion; provided, however, the balance of the Refusal Space that has not been offered to Tenant under this section remains subject to Tenant's Right of First Refusal provided herein.

The rights provided to Tenant in this Section (i) are subject to the pre-existing rights of other tenants of the Building as described on Exhibit C, attached hereto and made a part hereof, and (ii) shall not inure to the benefit of any subtenant of all or a portion of the Premises.

11. Option to Extend. Tenant shall have the option to extend the term of the Lease for one period of five Lease Years (the "Renewal Term") provided that Tenant shall give written notice to Landlord of its desire to exercise its right to the Renewal Term at least one hundred and eighty days prior to the end of the then current term; failing which the rights of Tenant under this Section shall be null and void and of no further force and effect. During the Renewal Term, the terms of the Lease shall continue in full force and effect, including, that Base Rent shall continue to increase by the Base Rent Escalation. During the Renewal Term, the Premises shall be leased by Tenant "as is," subject to Landlord's continuing Lease obligations (such as repair and maintenance).

12. Parking. With its lease of the Expansion Space, Tenant shall have the non-exclusive right to the use of up to forty-five (45) parking spaces at the Project.

13. Keys to Premises. Tenant shall be provided one key and/or fob for each of its employees (now or hereafter employed) for use at the Premises. Landlord shall have the right to charge a reasonable fee for replacement of any lost key or fob.

14. Brokerage. Tenant and Landlord each warrants and represents to the other that it has had no dealings with any real estate broker or agent in connection with this Lease other than DTZ, the "Tenant Broker," and Landlord agrees to pay a fee to the Tenant Broker pursuant to separate written agreement. Tenant and Landlord each covenants to pay, hold harmless, and indemnify the other from and against any and all costs, expenses, liabilities (including reasonable attorneys' fees), causes of action, claims or suits in connection with any compensation, commission, fee, or charges claimed by any other real estate broker or agent with respect to this Lease or the negotiation thereof, arising out of any act of said party.

15. Severability. In the event any term, covenant or condition of this Amendment, the Lease, or any amendments thereto shall to any extent be invalid or unenforceable, the remainder shall not be affected thereby and each term, covenant or condition shall be valid and enforceable to the full extent permitted by law.

16. Successors and Assigns. This Amendment shall apply to, inure to the benefit of, and be binding upon the parties hereto and upon their respective heirs, legal representatives, successors and permitted assigns, except as otherwise provided herein.

17. Authority of Parties. Each party hereto hereby certifies that it is authorized to enter into this Amendment, and that those persons signing below on its behalf are authorized to do so.

18. Full Force and Effect. Except as modified hereby, the Lease remains unmodified and in full force and effect.

19. Governing Law. This Amendment shall be governed by and construed in accordance with the laws of the State of North Carolina.

20. Mutual Acknowledgment of Non-Existence of Claims. Except as provided herein, Landlord and Tenant acknowledge and agree that as of the day hereof there are no known claims by either party against the other party hereto arising from the relationship as Landlord and Tenant, respectively, pursuant to the Lease, as amended.

21. Effective Date. The provisions of this Amendment shall be effective as of the day and year first written above.

22. Rights of Tenant. Tenant shall have no options to renew or extend the term of the Lease, rights to expand the Premises or rights of refusal except as expressly provided in this Amendment.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the parties hereto have hereunto executed this Amendment as of the day and year first above written.

TENANT:

PRECISION BIOSCIENCES, INC.

By: /s/ Matthew Kane
Print Name: Matthew Kane
Title: CEO
Date: June 20, 2015

LANDLORD:

VENABLE TENANT, LLC

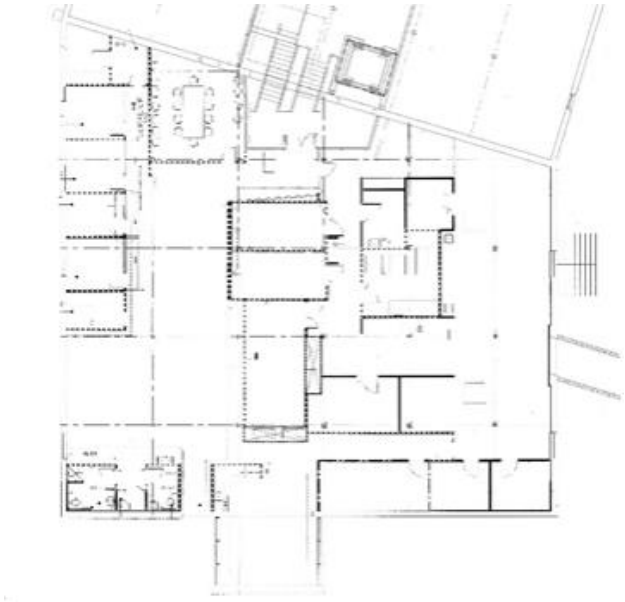
By: SCIENTIFIC PROPERTIES, LLC

By: /s/ Barbra Rothschild
Barbra Rothschild, Manager
Date: 20 June, 2015

EXHIBIT A

FLOOR PLAN

Suite A-200



Receiving Room Suite-30

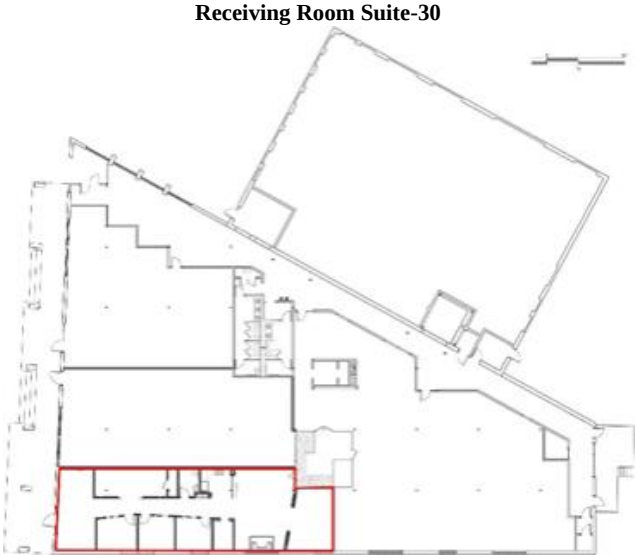


EXHIBIT B

WORK LETTER

This Exhibit B sets forth the rights and obligations of Landlord and Tenant with respect to the construction of the improvements to the Expansion Space Premises as described on the Plans ("Tenant Improvements"). This Exhibit contemplates that the following work will be performed, as further described herein, all subject to the prior review and approval by Landlord: (i) preparation of a space plan by the Architect; (ii) final design and engineering and preparation of plans, specifications, and working drawings by the Architect (collectively, the "Plans"); (iii) preparation by the general contractor of Landlord (the "General Contractor") of an estimate of the cost of the Tenant Improvements; (iv) submission to, and approval of Plans by, appropriate governmental authorities; and (v) construction and installation of the Tenant Improvements pursuant to the Plans on or prior to the Commencement Date, subject to Force Majeure and any Tenant Delay.

1. Allowance/Payment of Construction Costs.

(a) Landlord and Tenant shall mutually-approve and select a General Contractor to construct the Tenant Improvements in accordance with a milestone schedule (the "Schedule"), a copy of which shall be reasonably approved by Landlord and Tenant prior to commencement of construction of the Tenant Improvements. Landlord acknowledges and agrees that Clancy & Theys is deemed approved as a potential Contractor, should Tenant so choose. Landlord and Tenant shall prepare and mutually and reasonably approve a budget (the "Budget") for the costs to construct the Tenant Improvements (the "Construction Costs"). The Budget will not include any amounts for furniture, fixtures (other than lighting), equipment, or personal property of Tenant, which items will be paid for by Tenant separately at its expense. The Budget shall include a Construction Contingency which shall be 5% of the Construction Costs. Any unspent Construction Contingency will accrue to the Tenant. Change Orders (as hereinafter defined) shall be funded from increases in the Contract (as hereinafter defined). Landlord agrees to fund a portion of the Construction Costs through the provision of the Upfit Allowance of $250,000. The Upfit Allowance shall be used for items specifically outlined in the Budget and mutually agreed upon by both Landlord and Tenant. The Upfit Allowance shall be used only for construction, design, and management costs related to fixed improvements to the Building that are part of the Tenant Improvements. The Upfit Allowance may not be used to offset any Rent payments owed to Landlord by Tenant. Any costs incurred due to a Tenant Delay shall be charged against the Upfit Allowance; provided, however, Tenant shall be given two (2) days' notice and opportunity to cure any Tenant Delay (including payment by Tenant of any costs associated with such cure such as higher shipping charges) before any costs are charged against the Upfit Allowance. Landlord and Tenant acknowledge and agree that the Construction Costs will be in excess of the Upfit Allowance, and all costs for the Tenant Improvements in excess of the Upfit Allowance shall be borne by Tenant. Therefore, Tenant has agreed to place into an escrow account maintained with Landlord (the "Escrow Account") an amount equal to the Construction Costs as specified in the Budget minus the Upfit Allowance (the "Tenant Improvement Overage"). Landlord shall establish the Escrow Account as a separate, interest bearing account in an FDIC insured institution. set forth below, Landlord shall have the authority to make periodic deductions from the Escrow Account as payment for the Construction Costs and the Escrow Account shall be funded in full by Tenant

prior to Landlord's issuance of a Notice to Proceed to the General Contractor. Failure by Tenant to deposit the Tenant Improvement Overage into the Escrow Account within five (5) business days after a request from Landlord hereunder shall be a Tenant Delay and a default in payment hereunder. Tenant shall receive all interest that accrues under the Escrow Account.

(b) The Upfit Allowance and Tenant Improvement Overage shall be disbursed by Landlord upon satisfaction of the following conditions precedent: (i) Landlord shall have received applications for payment certified by the Architect, accompanied by evidence of the portion of the Tenant Improvements that have been completed per the Plans, invoices and paid receipts for all such work completed, and copies of executed lien waivers from those persons providing such work; and (ii) all information and documentation provided to Landlord must be in form and substance reasonably approved by Landlord. Upon Tenant's request, Landlord shall provide Tenant an opportunity to review such information and documentation.

(c) Provided the aforesaid conditions are met, Landlord shall pay the Construction Costs at monthly intervals based upon design and construction billing cycles. Each monthly payment of the Construction Costs shall be paid as follows: fifty percent (50%) of such payment shall be paid from the Upfit Allowance and the remaining fifty percent (50%) of such payment shall be paid from the Tenant Improvement Overage through the Escrow Account. Within thirty (30) days after the Commencement Date, Landlord shall prepare and submit to Tenant a final statement that illustrates the total cost to construct the Tenant Improvements and the amount paid from and remaining with respect to each of the Tenant Improvement Overage as held in the Escrow Account, and the Upfit Allowance. If such statement indicates that Landlord has paid less than the total amount of the Upfit Allowance, then Landlord shall pay Tenant an amount equal to the Upfit Allowance minus the total amount previously paid by Landlord within ten (10) days of the date of such statement. If such statement reflects that the amount deposited into Escrow Account by Tenant as the Tenant Improvement Overage was greater than the amount required to be paid by Tenant, then Tenant shall be entitled to a prompt refund of any such amounts.

(d) Unless otherwise specified in the Plans, materials used for the Tenant Improvements at the Building shall be good quality, new, and customary for the type of upfit contemplated in this Lease and in facilities comparable to the Building and readily available in the market where the Building is located, all as reasonably determined by Landlord.

(e) During construction of the Tenant Improvements, Landlord and Tenant or their agents shall, on a weekly basis review work schedules, costs, expenses and construction issues regarding the construction of the Tenant Improvements. The parties will hold periodic meetings, at mutually agreed upon times and locations, to discuss the progress of the construction of the Tenant Improvements. The General Contractor will provide an updated Budget, Schedule, and RFI log every two weeks during construction of the Tenant Improvements. The General Contractor and Landlord reserve the right to cure self imposed delays in the Schedule.

(f) Should a default or event of default occur by Tenant hereunder prior to the Commencement Date, Landlord shall have the right to cease all construction of the Tenant Improvements, and pursue all of its rights and remedies hereunder, or available at law or in equity for any such default or event of default.

2. Space Planning, Design and Working Drawings. Tenant shall engage Integrated Design (the "Architect") to prepare the Plans. Tenant may include fees previously paid to the Architect in the approved Budget. Any Architect's fees reimbursed to Tenant from the Upfit Allowance shall be paid from the Upfit Allowance by Landlord upon receipt and approval by Landlord of invoices and lien waivers for work performed. If the Architect used by Tenant is not qualified with respect to compliance of the Plans with historic tax credit laws, statutes and regulations, Belk Architecture or another architect with historic tax credit expertise shall review the Plans to insure compliance with the requirements of State and Federal law for historic tax credits and all the costs for such review shall be borne by Landlord. Tenant shall review and respond to any request for approval of the draft plans or final Plans (by U.S. Mail, facsimile, or email) within five (5) business days after a request from either the Architect or Landlord. Any modifications of the Plans sought by Tenant shall be reviewed and subject to the approval of Landlord prior to the modification of the Plans. All communication by Tenant to Landlord with respect to the Tenant Improvements shall be in writing. Tenant shall designate an Authorized Representative to work with Landlord with respect to the Tenant Improvements, and Landlord shall not be obligated to respond to any instructions, approvals, changes, or other communications from anyone claiming to act on Tenant's behalf other than Tenant's Authorized Representative. Review and approval by Landlord of the Plans shall not be construed as any statement by Landlord as to the compliance of the Plans with Applicable Laws.

3. Construction of Tenant Improvements. Landlord shall, via the General Contractor, obtain all state and local licenses, permits and approvals (whether governmental or non-governmental) required to construct the Tenant Improvements and for Tenant's occupancy of the Expansion Space. Landlord shall provide access to the General Contractor for Construction of the Tenant Improvements and to the extent such access requires entry through space occupied by other tenants, Landlord shall provide for such access at its sole cost and expense. The Landlord shall engage, subject to Tenant's reasonable approval, a general contractor to construct the Tenant Improvements (the "General Contractor"). The General Contractor shall construct and install the Tenant Improvements in accordance with the Plans which expense shall be deducted from the Upfit Allowance. The Tenant Improvements shall be delivered via Associated General Contractors (AGC) Guaranteed Maximum Price Contract (the "Contract") with Liquidated Damages of $500.00 per day, and a payment and performance bond. Any Liquidated Damages (less cost of collection) paid to Landlord shall accrue to the Tenant; provided, however, any paid Liquidated Damages for any Tenant Delay shall accrue to Landlord. The General Contractor shall obtain at least three (3) bids for all major trade work at the Expansion Space. Landlord will work with the General Contractor to complete the Tenant Improvements by the Commencement Date. All contracts with vendors and subcontractors for construction of the Tenant Improvements will be negotiated by the General Contractor. All work performed in connection with the construction of the Expansion Space shall be performed in a good and workmanlike manner, in accordance with all Applicable Laws and the final approved Plans. If materials are not readily available, require quick ship charges, or require substitution, the Tenant will be given notice and the opportunity to select alternate materials. Landlord shall insure that the Architect conducts a periodic review (a minimum of once every two weeks) of the progress of construction to ensure compliance with the Plans. Tenant may from time to time request in writing changes to the Plans (a "Change Order"), subject to Landlord's consent, which shall not be unreasonably withheld. Landlord shall cause

Contractor to provide an estimate of any change in the Construction Cost and/or Schedule. Tenant shall have the right to elect whether or not to proceed with the Change Order within five (5) business days after receipt of such estimate. Upon such approval by Tenant, or confirmation by Landlord that the Change Order will not result in any change in cost and/or Schedule, Landlord shall implement the Change Order as part of the Tenant Improvements. Landlord acknowledges that Tenant may hire the General Contractor and/or any subcontractors to perform other work items (in accordance with the terms and conditions of the Lease) within the original Premises concurrently with the Tenant Improvements, provided such work does not require changes to the Schedule.

Tenant acknowledges that the following items may result in changes to the Budget and/or Schedule:

(i) Municipal or other governmental inspectors require changes to the Expansion Space such as code compliance changes. In such event, Landlord will notify Tenant of the required changes, but the increased cost of such changes, if any, and any delay associated with such changes shall be the responsibility of Tenant.

(ii) Change Orders approved by Tenant. Any increased costs and delays due to such approved Change Orders shall be the responsibility of Tenant. Any delays caused by such approved Change Orders shall not delay the Commencement Date of the Lease. Landlord shall not charge Tenant any administrative fees in respect of any Change Orders. Tenant shall have five (5) business days to review and approve all Change Orders and any additional review time by Tenant shall be a Tenant Delay.

(iii) If materials are not readily available, require quick ship charges, or require substitution, provided Landlord shall identify any such materials within ten (10) days of final approval of the Plans, and in any such case, Tenant will be given notice and the opportunity to select alternate materials.

(iv) Any Tenant Delay.

4. Repairs and Corrections. Landlord shall require of the General Contractor and any subcontractor constructing the Tenant Improvements no less than a one year express repair and/or replacement warranty covering such work. All manufacturers' and builders' warranties with respect to the Tenant Improvements shall be assigned to Tenant to the extent possible and necessary to assist Tenant in effecting any of Tenant's repair obligations under the Lease without recourse to Landlord. Landlord agrees to enforce for the benefit of Tenant any warranties or guarantees issued in connection with construction of the Tenant Improvements. Tenant shall repair or correct any defective work or materials installed by Tenant or any contractor other than the General Contractor (except subcontractors engaged by the General Contractor), or any work or materials that prove defective as a result of any act or omission of Tenant or any Tenant Party, provided that selection of materials by Tenant is not such an act or omission, and provided further that work and materials done or installed by the General Contractor or its vendors and subcontractors is not such an act or omission. For purposes of this Section, Landlord will not be considered to be Tenant's agent, invitee, licensee, subtenant, customer, client, or guest.

5. Punchlist. Landlord shall provide Tenant with written notice when Landlord believes that substantial completion of the Tenant Improvements has been achieved. Promptly following delivery of such notice, Tenant's Representative and Landlord's Representative shall jointly inspect the Tenant Improvements, and, Landlord and Tenant shall mutually and reasonably prepare a punchlist of items remaining with respect to the Tenant Improvements that require repair or completion (the "Punchlist"). Pursuant to its contract with Landlord, General Contractor shall make all repairs and completions noted on the Punchlist with respect to the Tenant Improvements within forty-five (45) days (extended for Force Majeure and any Tenant Delay) after receipt of the Punchlist with any Liquidated Damages paid by the General Contractor for a delay in completion of the Punchlist accruing to the benefit of Tenant.

6. Move-In by Tenant. Tenant shall schedule its move into the Expansion Space with Landlord prior to occupying any portion of the Expansion Space.

7. Tenant Representative. Whenever Landlord or any contractor responsible for the Tenant Improvements shall need to communicate with Tenant about the Tenant Improvement related matters, including Change Orders, Landlord or such contractor shall contact Todd Melby at todd.melby@precisionbiosciences.com or (330) 329-4015.

8. Landlord Representative. Whenever Tenant or any contractor responsible for the Tenant Improvements shall need to communicate with Landlord about the Tenant Improvement related matters, including Change Orders, Tenant or such contractor shall contact David.Green@scientificproperties.com, or (919) 605-0804.

EXHIBIT C

TENANTS WITH SUPERIOR RIGHTS OF REFUSAL

1. Cumming Construction Management, Inc. (first floor of Prizery Building); and
2. Roivant Sciences, Inc. (continuous “right of offer” for contiguous space on second floor of Prizery Builidng).

THIRD AMENDMENT TO THE LEASE AGREEMENT

THIS THIRD AMENDMENT TO THE LEASE AGREEMENT (the "Amendment") is made and entered into as of January 12, 2016 by and between VENABLE TENANT, LLC, a North Carolina limited liability company (the "Landlord"), and PRECISION BIOSCIENCES, INC., a Delaware corporation (the "Tenant").

WITNESSETH:

WHEREAS, pursuant to that certain Lease Agreement dated April 5, 2010 by and between Landlord and Tenant, as amended by that certain First Amendment to Lease Agreement dated August 19, 2011, Tenant leased certain premises known as Suite 100 in the Dibrell A Building at 302 East Pettigrew Street, Durham, NC (the Lease Agreement and all amendments thereto shall be referred to herein collectively as the "Lease"); and

WHEREAS, Landlord and Tenant have amended the Lease by Second Amendment to Lease Agreement dated July 13, 2015 (the "Second Amendment");

NOW, THEREFORE, in consideration of cash in hand paid and the promises and the provisions contained herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Landlord and Tenant hereby agree as follows:

1. Definition of Terms. All capitalized terms contained herein and not otherwise defined shall be defined as provided in the Lease.

2. Rent Abatement Payment. Landlord and Tenant have agreed that in consideration of the payment by Landlord to Tenant of $51,023.00, Tenant hereby waives and releases any and all right Tenant may have for any further abatement of Rent (Landlord having already waived Tenant's Rent obligation for January, 2016) as described in the Second Amendment with respect to the portion of their Premises located in Suite A-100 in the Dibrell Building at the Project. For purposes of clarity, Landlord and Tenant acknowledge and agree that the Expansion Commencement Date (as such term is defined in the Second Amendment) shall be January 1, 2016.

3. Dibrell Building. Notwithstanding any provision in the Second Amendment to the contrary, Landlord and Tenant hereby confirm and agree that the total rentable square footage leased by Tenant in the Dibrell Building is 16,701 rentable square, consisting of Suite A-100 of 8,274 rentable square feet, and Suite A-200 of 8,427 rentable square feet.

4. Brokerage. Tenant and Landlord each warrants and represents to the other that it has had no dealings with any real estate broker or agent in connection with this Amendment. Tenant and Landlord each covenants to pay, hold harmless, and indemnify the other from and against any and all costs, expenses, liabilities (including reasonable attorneys' fees), causes of action, claims or suits in connection with any compensation, commission, fee, or charges claimed by any real estate broker or agent with respect to this Amendment or the negotiation thereof, arising out of any act of said party.

4. Severability. In the event any term, covenant or condition of this Amendment, the Lease, or any amendments thereto shall to any extent be invalid or unenforceable, the remainder shall not be affected thereby and each term, covenant or condition shall be valid and enforceable to the full extent permitted by law.

5. Successors and Assigns. This Amendment shall apply to, inure to the benefit of, and be binding upon the parties hereto and upon their respective heirs, legal representatives, successors and permitted assigns, except as otherwise provided herein.

6. Authority of Parties. Each party hereto hereby certifies that it is authorized to enter into this Amendment, and that those persons signing below on its behalf are authorized to do so.

7. Full Force and Effect. Except as modified hereby, the Lease remains unmodified and in full force and effect.

8. Governing Law. This Amendment shall be governed by and construed in accordance with the laws of the State of North Carolina.

9. Mutual Acknowledgment of Non-Existence of Claims. Except as provided herein, Landlord and Tenant acknowledge and agree that as of the day hereof there are no known claims by either party against the other party hereto arising from the relationship as Landlord and Tenant, respectively, pursuant to the Lease, as amended.

10. Effective Date. The provisions of this Amendment shall be effective as of the day and year first written above.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the parties hereto have hereunto executed this Amendment as of the day and year first above written.

TENANT:

PRECISION BIOSCIENCES, INC.

By: /s/ Todd Melby
Print Name: Todd Melby
Title: CFO/COO
Date: January 18, 2016

LANDLORD:

VENABLE TENANT, LLC

By: SCIENTIFIC PROPERTIES, LLC,
its managing member

By: /s/ Garril Kueber
Garril Kueber, Limted Manager / CEO
Date: January 18, 2016

FOURTH AMENDMENT TO LEASE AGREEMENT

THIS FOURTH AMENDMENT TO LEASE AGREEMENT (this "Amendment") is made as of the 30th day of September, 2016 by and between **VENABLE CENTER, LLC**, a North Carolina limited liability company ("Landlord"), and **PRECISION BIOSCIENCES, INC.**, a Delaware corporation ("Tenant"), with respect to the following recitals:

(a) Landlord is the current owner of a group of interconnected buildings situated at 302 East Pettigrew Street, Durham, North Carolina known collectively as "Venable Center" (the "Project"), which comprises Dibrell A ("Dibrell A"), Dibrell B ("Dibrell B"), the Receiving Room (the "Receiving Room") and the Prizery (the "Prizery"). The first and second floors of the Prizery are shown in more detail on **Exhibit B** attached hereto and incorporated herein by reference.

(b) Pursuant to that certain Lease Agreement dated April 5, 2010, as modified by a First Amendment to Lease Agreement dated August 19, 2011 and by a Second Amendment to the Lease Agreement dated July 13, 2015 (the "Second Amendment") and by a Third Amendment to the Lease Agreement dated January 12, 2016 (collectively, the "Lease"), Landlord (as successor to Venable Tenant LLC) leases to Tenant certain office space in the Project (the "Current Premises") consisting of approximately 16,701 square feet of rentable area in Dibrell A (Suite A-100 = 8,274 RSF; Suite A-200 = 8,427 RSF, collectively referred to herein as the "Current DA Premises") and 2,863 square feet of rentable area in the Receiving Room (referred to herein as the "Current RR Premises"), as more particularly described in the Lease;

(c) The term of the Lease is currently scheduled to expire July 31, 2021.

(d) Landlord and Tenant have agreed to extend the term of the Lease, to add certain space to the premises demised under the Lease, and to make certain other modifications to the Lease as set forth hereinbelow;

(e) All capitalized terms used in this Amendment that are not otherwise defined herein shall have the meanings ascribed to such terms in the Lease.

NOW, THEREFORE, in consideration of the mutual covenants contained herein, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Landlord and Tenant agree as follows:

1. The Term of the Lease is hereby extended through July 31, 2024 (the "Expiration Date").

2. Effective as of the respective Expansion Dates set forth below, Landlord hereby leases to Tenant, and Tenant hereby leases from Landlord, the following additional premises in the Project, as outlined on Exhibit A attached hereto:

(a) approximately 11,621 Rentable Square Feet ("RSF") located in the Receiving Room (the "RR Expansion Premises"). The Expansion Date for the RR Expansion Premises shall be the 150th day following the date that Landlord delivers possession of the RR Expansion Premises to Tenant (in good and tenantable condition, broom clean, with all systems serving same in good working order), which delivery date is anticipated to be September 15, 2016 (resulting in an anticipated Expansion Date of February 15, 2017);

(b) approximately 7,494 RSF located on the 2nd floor of the Prizery (the "PR Second Floor Expansion Premises"), as shown on **Exhibit B**. Tenant acknowledges that certain portions of the PR Second Floor Expansion Premises are currently vacant and other portions of the PR Second Floor Expansion Premises are currently occupied by various tenants. Landlord shall deliver possession of each portion of the PR Second Floor Expansion Premises to Tenant as such portion of the PR Second Floor Expansion Premises is vacant and available to be delivered to Tenant (but, so long as Tenant does not commence the conduct of business in any portion of the PR Second Floor Expansion Premises, such partial delivery shall not trigger commencement of the term with respect to the same, nor commencement of the Base Rent "clock," as Tenant will be unable to commence its construction activities until the full floor is delivered in accordance with this Amendment; however, if Tenant commences the conduct of business in any portion of the PR Second Floor Expansion Premises, then the term will commence with respect to all portions of the PR Second Floor Expansion Premises that have been delivered to Tenant). Landlord agrees to endeavor in good faith to terminate or relocate the existing tenants of the PR Second Floor Expansion Premises, so as to deliver possession of each portion of the PR Second Floor Expansion Premises to Tenant as promptly as practicable. The Expansion Date with respect to the entire PR Second Floor Expansion Premises (unless occurring sooner with respect to portions of the PR Second Floor Expansion Premises pursuant to the foregoing provisions of this Section 2(b)) shall be the thirtieth (30th) day following the date that possession of the entire PR Second Floor Expansion Premises is delivered to Tenant (in good and tenantable condition, broom clean, with all systems serving same in good working order);

(c) approximately 7,416 RSF on the first floor of Dibrell B (the "DB First Floor Expansion Premises"). Tenant acknowledges that the DB First Floor Expansion Premises is currently occupied by a tenant whose lease term expires June 30, 2019, but that such current tenant may be induced to vacate the DB First Floor Expansion Premises sooner than such scheduled lease expiration date. Tenant will take possession of the DB First Floor Expansion Premises as soon as such space is vacant and available. The Expansion Date for the DB First Floor Expansion Premises shall be the 90th day following the date that Landlord delivers possession of the DB First Floor Expansion Premises to Tenant (in good and tenantable condition, broom clean, with all systems serving same in good working order). Rent shall be paid on the same terms (on a per square foot basis) as the RR Expansion Premises;

(d) approximately 7,416 RSF on the second floor of Dibrell B (the "DB Second Floor Expansion Premises"). Tenant acknowledges that the DB Second Floor Expansion Premises is currently occupied by a tenant whose lease term expires June 30, 2019.

Landlord will use best efforts to cause the current tenant of the DB Second Floor Expansion Premises to vacate such space as soon as possible; provided that Landlord shall not be obligated to offer such current tenant any payment or other economic inducement to vacate such space prior to the expiration of such current tenant's lease term. Tenant will take possession of the DB Second Floor Expansion Premises as soon as such space is vacant and available. The Expansion Date for the DB Second Floor Expansion Premises shall be the 30th day following the date that Landlord delivers possession of the DB Second Floor Expansion Premises to Tenant (in good and tenantable condition, broom clean, with all systems serving same in good working order). Rent shall be paid on the same terms (on a per square foot basis) as the PR Second Floor Expansion Premises;

3. Base Rent with respect to each Expansion Premises shall be as set forth in the following tables:

RR Expansion Premises (11,621 SF)

Months Following RR Expansion Premises Expansion Date	Annual Base Rent per Rentable Square Foot (NNN)	Monthly Rent
1 – 12	$19.25	$18,642.02
13 – 24	$19.78	$19,155.29
25 – 36	$20.32	$19,678.23
37 – 48	$20.88	$20,220.54
49 – 60	$21.46	$20,782.23
61 – 72	$22.05	$21,353.59
73 – 84	$22.65	$21,934.64
85 – Expiration Date	$23.28	$22,544.74

PR Second Floor Expansion Premises (or respective portions thereof) (7,494 SF)

Months Following PR Second Floor Expansion Premises Expansion Date	Annual Base Rent per Rentable Square Foot (FS)	Monthly Rent
1 – 12	$25.00	$15,612.50
13 – 24	$25.69	$16,043.41
25 – 36	$26.39	$16,480.56
37 – 48	$27.12	$16,936.44
49 – 60	$27.87	$17,404.82
61 – 72	$28.63	$17,879.44
73 – 84	$29.42	$18,372.79
85 – Expiration Date	$30.23	$18,878.64

Landlord and Tenant agree to reasonably document (via e-mail or otherwise in writing) the relevant Expansion Date for each of the Expansion Premises, for the avoidance of confusion or misunderstanding.

DB First Floor Expansion Premises (7,416 SF)

Months Following RR Expansion Premises Expansion Date*	Annual Base Rent per Rentable Square Foot (NNN)	Monthly Rent
1 – 12	$19.25	$11,896.50
13 – 24	$19.78	$12,224.04
25 – 36	$20.32	$12,557.76
37 – 48	$20.88	$12,903.84
49 – 60	$21.46	$13,262.28
61 – 72	$22.05	$13,626.90
73 – 84	$22.65	$13,997.70
85 – Expiration Date	$23.28	$14,387.04

DB Second Floor Expansion Premises (7,416 SF)

Months Following PR Second Floor Expansion Premises Expansion Date*	Annual Base Rent per Rentable Square Foot (FS)	Monthly Rent
1 – 12	$25.00	$15,450.00
13 – 24	$25.69	$15,876.42
25 – 36	$26.39	$16,309.02
37 – 48	$27.12	$16,760.16
49 – 60	$27.87	$17,223.66
61 – 72	$28.63	$17,693.34
73 – 84	$29.42	$18,181.56
85 – Expiration Date	$30.23	$18,682.14

*Base Rent with respect to the DB First Floor Expansion Premises and the DB Second Floor Expansion Premises shall commence to accrue only as of the respective Expansion Dates applicable to each of such spaces. From and after the respective Expansion Date applicable to each of such spaces, Base Rent shall be payable in the amounts set forth in the foregoing tables (and any rental amounts shown in the foregoing tables as being in effect during the periods preceding such Expansion Dates shall be relevant only for the purpose of determining the applicable escalated rental amounts due from and after such Expansion Dates). The purpose of measuring the periods in the foregoing tables from the Expansion Dates applicable to the RR Expansion Premises and the PR Second Floor Expansion Premises is so that the Base Rent per rentable square foot in effect from time-to-time with respect to the DB First Floor Expansion Premises will be the same as the Base Rent per rentable square foot

in effect with respect to the RR Expansion Premises, and the Base Rent per rentable square foot in effect from time-to-time with respect to the DB Second Floor Expansion Premises will be the same as the Base Rent per rentable square foot in effect with respect to the PR Second Floor Expansion Premises.

Notwithstanding anything in the foregoing to the contrary, provided no Event of Default then exists under the Lease, Landlord agrees to grant Tenant an abatement of the Base Rent due with respect to each of the Expansion Premises, in an amount as set forth herein. With respect to the RR Expansion Premises and the PR Second Floor Expansion Premises, the rental abatement shall be five (5) monthly installments of the Base Rent. With respect to each Expansion Premises having an Expansion Date later than February 1, 2017 (other than the RR Expansion Premises and the PR Second Floor Expansion Premises), the rental abatement shall be the product of (i) five (5) monthly installments of the Base Rent multiplied by (ii) a fraction, the numerator of which is the number of full calendar months remaining in the Term of this Lease as of the Expansion Date applicable to such Expansion Premises and the denominator of which is eighty-nine (89). Such abatement shall be applied to the monthly installments of Base Rent that would otherwise be due for the months commencing with January 2018; provided that, with respect to any Expansion Premises whose Expansion Date occurs later than January 1, 2018, the abatement period shall be the first full and partial calendar months following the Expansion Date applicable to such Expansion Premises.

4. Effective as of the Expansion Date for the RR Expansion Premises (which date is referred to herein as the "RR Adjustment Date"), the Base Rent with respect to the Current RR Premises shall be converted to a "triple-net" rental rate, and Tenant shall pay, with respect to the Current RR Premises, its Proportionate Share of all Operating Expenses from and after the Expansion Date for the RR Expansion Premises. Effective as of the RR Adjustment Date, the Base Rent with respect to the Current RR Premises shall be as set forth in the following table:

Current RR Premises (2,863 SF)

Period	Annual Base Rent per Rentable Square Foot (NNN)	Monthly Rent
RR Adjustment Date – 2/28/17	$15.25	$3,638.40
3/1/17 – 2/28/18	$15.67	$3,738.45
3/1/18 – 2/28/19	$16.10	$3,841.26
3/1/19 – 2/28/20	$16.54	$3,946.89
3/1/20 – 2/29/21	$17.00	$4,055.43
3/1/21 – 7/31/21	$17.47	$4,166.96

5. Effective as of August 1, 2021, Base Rent with respect to the Current RR Premises and the Current DA Premises shall be the then-current rates of the Receiving Room (both on a NNN basis), as illustrated in the following tables:

Current RR Premises (2,863 SF)

Period*	Annual Base Rent per Rentable Square Foot (NNN)	Monthly Rent
8/1/21 – 60	$21.46	$5,120.00
61 – 72	$22.05	$5,260.76
73 – 84	$22.65	$5,403.91
85 – Expiration Date	$23.28	$5,554.22

*Escalations based on number of months following RR Expansion Premises Expansion Date, consistent with Section 3 of this Amendment.

Current DA Premises (16,701 SF)

Period*	Annual Base Rent per Rentable Square Foot (NNN)	Monthly Rent
8/1/21 – 60	$21.46	$29,866.96
61 – 72	$22.05	$30,688.09
73 – 84	$22.65	$31,523.14
85 – Expiration Date	$23.28	$32,399.94

*Escalations based on number of months following RR Expansion Premises Expansion Date, consistent with Section 3 of this Amendment.

6. Tenant's Proportionate Share of Operating Expenses with respect to the respective Expansion Premises is as follows:

Expansion Premises	Tenant's Proportionate Share of the Building	Tenant's Proportionate Share of the Project
RR Expansion Premises	79.25482%	12.76767%
PR Second Floor Expansion Premises	22.07039%	8.70729%
DB First Floor Expansion Premises	50.00000%	8.62655%
DB Second Floor Expansion Premises	50.00000%	8.62655%

The Base Rent stated above with respect to the RR Expansion Premises and the DB First Floor Expansion Premises is a "triple-net" rental rate, and Tenant shall pay, with respect to each such Expansion Premises, its Proportionate Share of all Operating Expenses from and after the Expansion Date applicable to each such Expansion Premises. The Base Rent stated above with respect to the PR Second Floor Expansion Premises and the DB Second Floor Expansion Premises is a "full-service" rental rate, and Tenant shall pay, with respect to each such Expansion Premises, from and after January 1, 2018, its Proportionate Share of increases in Operating Expenses over the Operating Expenses incurred in calendar year 2017.

7. Landlord hereby agrees to grant Tenant an allowance ("Improvements Allowance") with respect to each Expansion Premises. The Improvements Allowance granted with respect to each Expansion Premises shall be calculated by reference to the Base Improvements Allowance per Rentable Square Foot ("Base Amount") set forth in the following table:

Expansion Premises	Base Improvements Allowance per Rentable Square Foot
RR Expansion Premises	$45.00
PR Second Floor Expansion Premises	$25.00
DB First Floor Expansion Premises	$45.00
DB Second Floor Expansion Premises	$25.00

For the RR Expansion Premises and the PR Second Floor Expansion Premises, the Improvements Allowance shall be the Base Amount set forth in the foregoing table. For each Expansion Premises having an Expansion Date later than February 1, 2017 (other than the RR Expansion Premises and the PR Second Floor Expansion Premises), the Improvements Allowance shall be the product of (i) the Base Amount set forth in the foregoing table multiplied by (ii) a fraction, the numerator of which is the number of full calendar months remaining in the Term of this Lease as of the Expansion Date applicable to such Expansion Premises and the denominator of which is eighty-nine (89).

The Improvements Allowances shall be applied toward the cost of the design and construction of any alterations Tenant desires to perform in the Expansion Premises in conjunction with Tenant's initial occupancy of such Expansion Premises. Any portion of the Improvements Allowances may be applied to pay the fees of the architect and engineers and any project manager employed by Tenant with respect to such alterations, as well as any permit costs and fees.

The cost of Tenant's alterations in each of the Expansion Premises shall be paid first out of the applicable Improvements Allowance until the Improvements Allowance is exhausted. Tenant shall deliver to Landlord, no more frequently than once per month, invoices for work performed hereunder together with any other supporting documentation reasonably requested by Landlord. Provided no Event of Default then exists under the Lease, the Improvements Allowance (or portions thereof) shall be disbursed to Tenant within thirty (30) days following Tenant's submission to Landlord of paid invoices for work related to alterations performed by Tenant in the Expansion Premises, accompanied by waivers of liens executed by all contractors employed by Tenant for the performance of such work. If the cost of Tenant's alterations in the Expansion Premises exceeds the amount of the applicable Improvements Allowance, the excess shall be paid by Tenant after the Improvements Allowance is fully exhausted. Notwithstanding the foregoing, the Improvements Allowance associated with any particular Expansion Premises may

be utilized by Tenant in the Expansion Premises with which it is associated and/or in any other Expansion Premises that is delivered to Tenant either concurrently with or following the delivery date of the Expansion Premises with which such Improvements Allowance is associated. Tenant may also submit invoices for an existing or completed Expansion Premises project when a new Improvements Allowance becomes available.

Any portion of the Improvements Allowance that has not been utilized by the date that is twelve (12) months following the last Expansion Date applicable to any of the Expansion Premises (as referenced in Section 2 of this Amendment) shall revert to Landlord.

In no event may any portion of the Improvements Allowances may be utilized with respect to alterations or refurbishment performed in the Current Premises.

8. Landlord hereby agrees to grant Tenant an allowance in the amount of $97,820.00 (the "Refurbishment Allowance"), to be applied toward the cost of performing alterations and refurbishment in the Current Premises. Any portion of the Refurbishment Allowances may be applied to pay the fees of the architect and engineers and any project manager employed by Tenant with respect to such alterations, as well as any permit costs and fees. Provided no Event of Default then exists under the Lease, the Refurbishment Allowance (or portions thereof) shall be disbursed to Tenant within thirty (30) days following Tenant's submission to Landlord of paid invoices for alterations or refurbishment performed by Tenant in the Current Premises after the date of this Amendment, accompanied by waivers of liens executed by all contractors employed by Tenant for the performance of such work (to the extent reasonably required). Requisitions shall be submitted by Tenant no more frequently than once per month. If the cost of Tenant's alterations and refurbishment in the Current Premises exceeds the amount of the Refurbishment Allowance, the excess shall be paid by Tenant after the Refurbishment Allowance is exhausted. Additionally, Tenant may elect to apply any unexpended Refurbishment Allowance toward work in any Expansion Premises, on the same terms and conditions as listed in Section 7 above.

9. Landlord acknowledges that, following delivery of the RR Expansion Premises to Tenant, Tenant will be the exclusive user of the "private shipping and receiving area" of the loading dock in the Receiving Room, as shown on the attached **Exhibit A** (the "S&R Area"), except as specifically provided herein. Landlord shall reasonably cooperate with Tenant to facilitate Tenant's use of the loading dock as the primary user thereof; and Tenant agrees to afford Landlord and other tenants of the Receiving Room reasonable access to and use of such loading dock, provided that such access and use does not materially impair Tenant's use of such facility. Landlord agrees that it will use best efforts to give Tenant not less than twenty-four (24) hours' prior notice (which need not be in writing) to access and to use the loading dock so that Tenant can appropriately coordinate (clearance of space and security of items in the space). Tenant, at Tenant's sole cost, shall relocate the existing mailboxes in the loading dock to a mutually-agreeable location outside the S&R Area, and shall provide a means of access to the IT cabinet that does not require access through the S&R Area, such work to be subject to Landlord's reasonable prior approval.

10. Tenant shall have the right, at Tenant's expense and for its own use, to purchase, install, maintain and operate at the Project an emergency power generator (the "Generator") and a fuel tank (the "Tank") for the Generator, subject to the following terms and conditions:

(a) The Generator and Tank and associated wiring shall be installed by contractors reasonably pre-approved by Landlord, in a good and workmanlike manner and in accordance with the reasonable directions of Landlord relative thereto. Tenant and/or its contractors shall provide all appropriate insurance for such installation. Tenant shall deliver to Landlord detailed plans and specifications for the Generator and the Tank (including the proposed location of the Generator and the Tank) and a copy of Tenant's contract for installing the Generator and the Tank, which plans and specifications and contract and the location of the Generator and Tank shall be subject to Landlord's reasonable approval. If deemed desirable by Landlord, Tenant shall cause the space within which the Generator and Tank are located to be screened in a manner that is reasonably acceptable to Landlord.

(b) Tenant shall pay all costs of design, installation, operation, utilization, replacement, maintenance and removal of the Generator and the Tank, including (without limitation) the cost of any piping needed to connect the Generator and the Tank. Any damage to the Project or other property of Landlord or any other tenant resulting from the installation or maintenance of the Generator and Tank shall be promptly repaired at Tenant's sole cost and expense.

(c) Tenant covenants that it will not use its Generator or the Tank in a manner that will unreasonably interfere with Landlord's and/or any current or future tenant's use of the Project.

(d) Tenant shall be responsible for procuring all licenses and permits required for the installation, use or operation of the Generator and the Tank.

(e) The Generator and Tank shall be designed, constructed, installed, maintained and operated in strict compliance with all applicable environmental laws.

(f) Landlord shall have no liability for any damage to, or caused by, the Generator and Tank. Tenant hereby indemnifies and agrees to hold Landlord harmless from any loss or damage which Landlord may sustain in connection with the Generator and Tank, including all liabilities, costs or expenses of any kind or nature incurred in connection with any claim or proceeding brought thereon and the defense thereof.

(g) Tenant is hereby granted nonexclusive easements and licenses for (i) use of any shafts required to install the electrical wiring for the Generator; and (ii) access to the Generator and the Tank at all reasonable times and in emergencies. The Generator shall be connected to the Premises by electrical wiring, the installation of which shall be performed by Tenant's contractor, at Tenant's sole expense.

(h) At Landlord's request, the Generator and Tank and associated wiring and piping and any screening surrounding the Generator and Tank installed by Tenant hereunder shall be removed by Tenant, by contractors reasonably pre-approved by Landlord, in a good and workmanlike manner, upon the expiration or earlier termination of the Lease, at Tenant's sole cost and expense.

11. The parking rights granted to Tenant under the Lease shall increase proportionately upon the Expansion Date applicable to each Expansion Premises.

12. This Amendment and all provisions contained herein are contingent upon an executed lease termination agreement between Landlord and the existing tenant ("Roivant") for the PR Second Floor Expansion Premises, providing that the PR Second Floor Expansion Premises shall be surrendered to Landlord on or before January 1, 2017 (the "PR Termination Agreement"). If Landlord does not enter into said PR Termination Agreement within fifteen (15) days of the date of full execution of this Amendment, then Tenant shall be entitled to terminate this Amendment (and all of its obligations hereunder) by written notice delivered to Landlord within thirty (30) days following the date of full execution of this Amendment (unless Landlord has entered into the PR Termination Agreement prior to Tenant's delivery of its termination notice, in which event this Amendment shall remain in force and effect).

13. The Right of Refusal granted to Tenant pursuant to Paragraph 10 of the Second Amendment shall remain in force and effect during the Term of the Lease as extended by this Amendment.

14. Except to the extent any of such suites are sooner leased by Tenant pursuant to its Right of First Refusal, Landlord and Tenant hereby agree to the following "must-take" expansion provisions with respect to Suites 110, 120, 130, and 140 of the Prizery, as shown on **Exhibit B**:

(a) Landlord shall deliver Suite 130 and Suite 140, comprising approximately 3,162 rentable square feet ("PR First Floor Expansion Premises A") to Tenant on or around September 1, 2017 (the PR First Floor Expansion Premises A Target Date"). Landlord will use commercially reasonable efforts to meet the PR First Floor Expansion Premises A Target Date. In the event Landlord is unable to deliver possession of the PR First Floor Expansion Premises A to Tenant on the PR First Floor Expansion Premises A Target Date due to an existing tenant's failure to vacate such space or any other cause beyond Landlord's reasonable control, Landlord shall have no liability to Tenant, and Tenant's obligation to lease the PR First Floor Expansion Premises A shall not be nullified, provided Landlord shall use commercially reasonable efforts to deliver possession of the PR First Floor Expansion Premises A to Tenant as soon as possible following the PR First Floor Expansion Premises A Target Date. The Expansion Date for the PR First Floor Expansion Premises A shall be the 30th day following the date that Landlord delivers possession of PR First Floor Expansion Premises A to Tenant (in good and tenantable condition, broom clean, with all systems serving same in good working order). Rent shall be paid on the same terms (on a per square foot basis) as the PR Second Floor Expansion Premises, and Tenant shall receive the same Improvement Allowance as the PR Second Floor Expansion Premises, on a per square foot basis, and prorated in accordance with Section 7 of this Amendment.

(b) Landlord shall deliver Suite 110 and Suite 120, comprising approximately 2,722 rentable square feet ("PR First Floor Expansion Premises B") to Tenant on or around November 1, 2018 (the "PR First Floor Expansion Premises B Target Date"). Landlord will use commercially reasonable efforts to meet the PR First Floor Expansion Premises B Target Date. In the event Landlord is unable to deliver possession of the PR First Floor Expansion Premises B to Tenant on the PR First Floor Expansion Premises B Target Date due to an existing tenant's failure to vacate such space or any other cause beyond Landlord's reasonable control, Landlord

shall have no liability to Tenant, and Tenant's obligation to lease the PR First Floor Expansion Premises B shall not be nullified, provided Landlord shall use commercially reasonable efforts to deliver possession of the PR First Floor Expansion Premises B to Tenant as soon as possible following the PR First Floor Expansion Premises B Target Date. The Expansion Date for the PR First Floor Expansion Premises B shall be the 30th day following the date that Landlord delivers possession of PR First Floor Expansion Premises B to Tenant (in good and tenantable condition, broom clean, with all systems serving same in good working order). Rent shall be paid on the same terms (on a per square foot basis) as the PR Second Floor Expansion Premises, and Tenant shall receive the same Improvement Allowance as the PR Second Floor Expansion Premises, on a per square foot basis, and prorated in accordance with Section 7 of this Amendment. Following the addition of PR First Floor Expansion Premises B to the Premises, Landlord agrees that Tenant may add the previously shared "common space" to its secured area, and Landlord and Tenant will mutually, in good faith, enter into a Lease amendment to document same.

(c) Notwithstanding anything in Paragraph 14(b) above, Tenant acknowledges that the current tenant of Suite 110 has the option to renew the term of its lease for an additional period of three (3) years. In the event the current tenant of Suite 110 timely exercises its renewal option, Landlord shall so notify Tenant in writing (the "Suite 110 Notice") within fifteen (15) business days of Landlord's receipt of same. In the event Landlord does not deliver the Suite 110 Notice to Tenant within fifteen (15) business days of the current tenant's renewal deadline (which renewal deadline Landlord represents, for the purposes of this Amendment, to be April 30, 2018), Landlord shall be conclusively deemed to have represented that the current Suite 110 tenant no longer has any valid right to renew, and Landlord shall initiate work promptly and diligently to meet the PR First Floor Expansion Premises B Target Date. Within thirty (30) days following Tenant's receipt of the Suite 110 Notice, Tenant may elect, by written notice to Landlord, to delete Suite 110 from the expansion space that is subject to the provisions of this Paragraph 14, in which event Landlord shall have no obligation to deliver possession of Suite 110 to Tenant at any time and Tenant shall have no obligation to lease Suite 110 from Landlord at any time. In the event Tenant does not timely exercise its right to delete Suite 110 from the expansion space under this Paragraph 14, then the delivery date for Suite 110 shall be extended to be the last day of the current tenant's three-year renewal term. Tenant's right pursuant to Paragraph 14(b) above to convert common space into secured area shall be inapplicable unless and until Suite 110 (as well as the remainder of PR First Floor Expansion Premises B) becomes part of the Premises demised to Tenant.

15. The Option to Extend granted to Tenant pursuant to Paragraph 11 of the Second Amendment shall remain in force and effect and shall be applicable to the period immediately following the Term of the Lease as extended by this Amendment.

16. Landlord and Tenant each warrant to the other that in connection with this Amendment neither has employed or dealt with any broker, agent or finder, other than CBRE-Raleigh, LLC and Cushman & Wakefield (the "Brokers"). Landlord acknowledges that it shall pay any commission or fee due to the Brokers, pursuant to a separate written agreement. Each party shall indemnify and hold the other harmless from and against any claim for brokerage or other commissions asserted by any broker, agent or finder employed by the indemnifying party or with whom the indemnifying party has dealt, other than the Brokers.

IN WITNESS WHEREOF, Landlord and Tenant have executed and delivered this Amendment as of the day and year first above written.

WITNESS:

Illegible

LANDLORD:

VENABLE CENTER, LLC

By: /s/ Esko I. Korhonen

Title: Member

WITNESS:

Illegible

TENANT:

PRECISION BIOSCIENCES, INC.

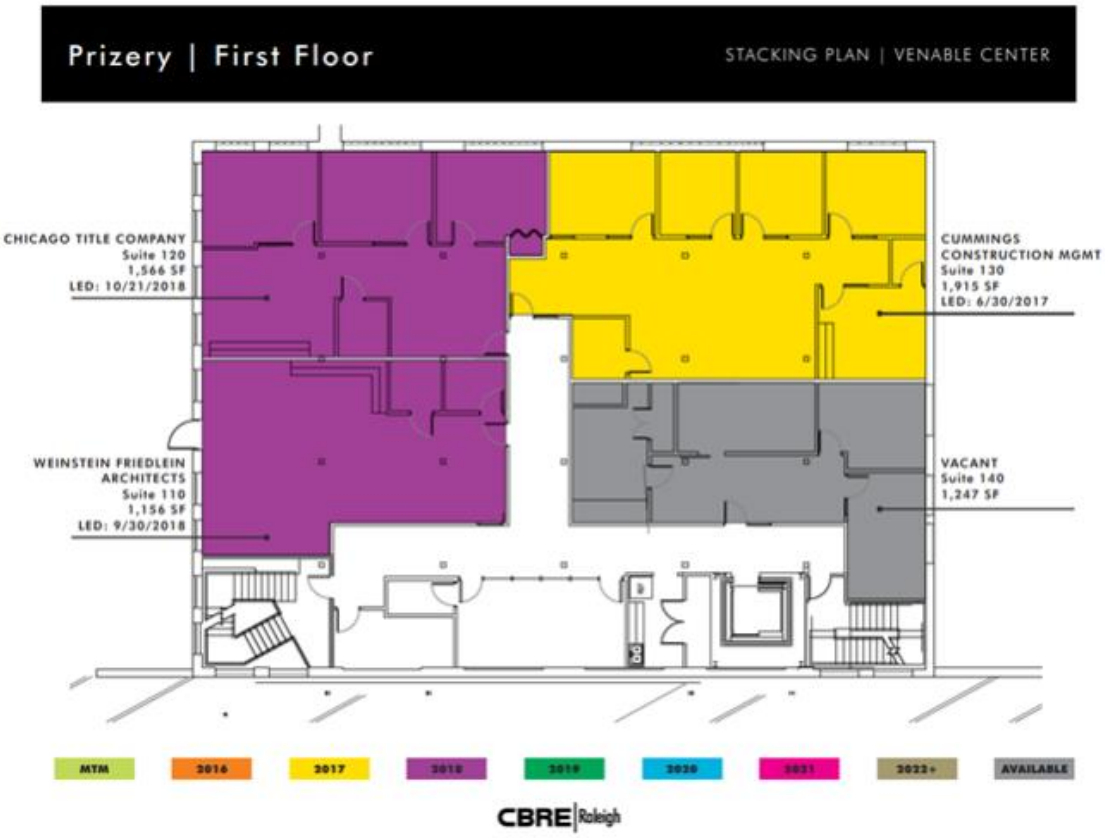
By: /s/ Todd Melby

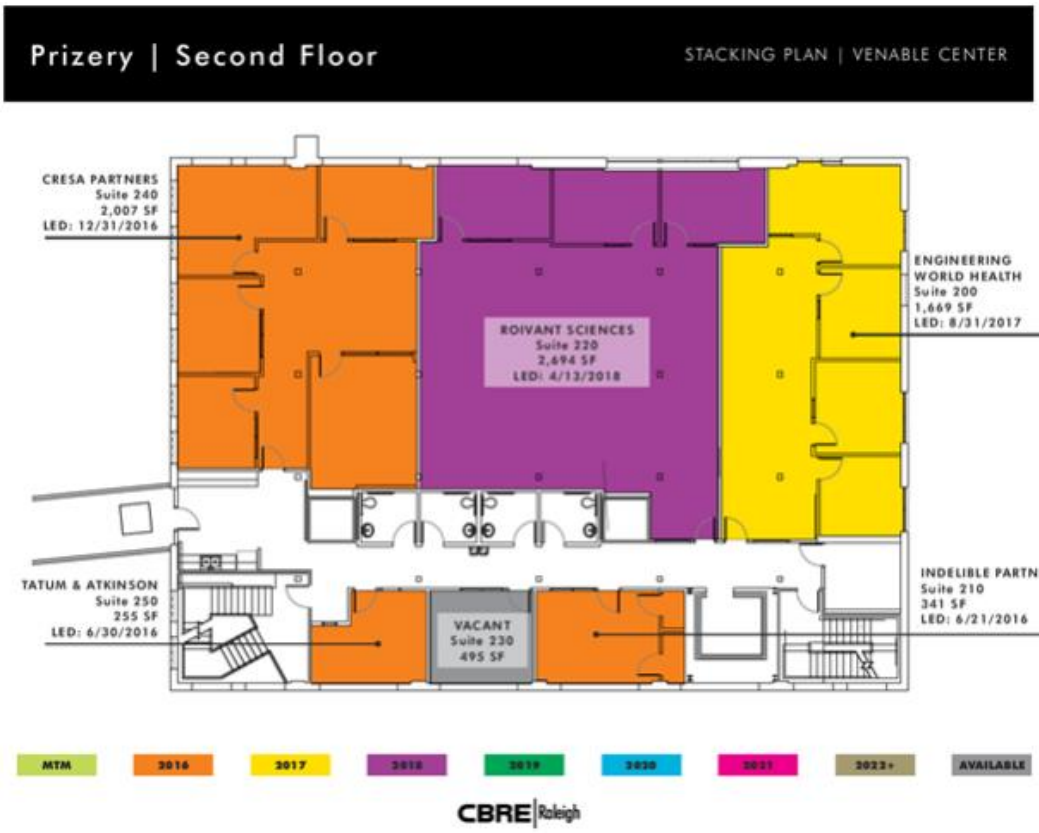
Title: COO

EXHIBIT A

FLOOR PLANS OF EXPANSION PREMISES

EXHIBIT B


Prizery | First Floor
STACKING PLAN | VENABLE CENTER
CHICAGO TITLE COMPANY
Suite 120
1,566 SF
LED: 10/21/2018
CUMMINGS
CONSTRUCTION MGMT
Suite 130
1,915 SF
LED: 6/30/2017
WEINSTEIN FRIEDLEIN
ARCHITECTS
Suite 110
1,156 SF
LED: 9/30/2018
VACANT
Suite 140
1,247 SF
MTM
2016
2017
2018
2019
2020
2021
2022+
AVAILABLE
CBRE Raleigh


Prizery | Second Floor
STACKING PLAN | VENABLE CENTER
CRESA PARTNERS
Suite 240
2,007 SF
LED: 12/31/2016
ROIVANT SCIENCES
Suite 220
2,694 SF
LED: 4/13/2018
ENGINEERING WORLD HEALTH
Suite 200
1,669 SF
LED: 8/31/2017
TATUM & ATKINSON
Suite 250
255 SF
LED: 6/30/2016
VACANT
Suite 230
495 SF
INDELIBLE PARTNERS
Suite 210
341 SF
LED: 6/21/2016
MTM
2016
2017
2018
2019
2020
2021
2022+
AVAILABLE
CBRE Raleigh

FIFTH AMENDMENT TO LEASE AGREEMENT

THIS FIFTH AMENDMENT TO LEASE AGREEMENT (this "Amendment") is made as of the 24th day of January, 2018 by and between **VENABLE CENTER, LLC**, a North Carolina limited liability company ("Landlord"), and **PRECISION BIOSCIENCES, INC.**, a Delaware corporation ("Tenant"), with respect to the following recitals:

(a) Landlord is the current owner of a group of interconnected buildings situated at 302 East Pettigrew Street, Durham, North Carolina known collectively as "Venable Center" (the "Project"), of which one of the buildings is known as the Prizery (the "Prizery") and one of the buildings is known as Dibrell C ("Dibrell C").

(b) Pursuant to that certain Lease Agreement dated April 5, 2010, as modified by a First Amendment to Lease Agreement dated August 19, 2011 and by a Second Amendment to the Lease Agreement dated July 13, 2015 (the "Second Amendment") and by a Third Amendment to the Lease Agreement dated January 12, 2016, and by a Fourth Amendment to the Lease Agreement dated September 30, 2016 (collectively, the "Lease"), Landlord (as successor to Venable Tenant LLC) leases to Tenant certain office space in the Project (the "Current Premises"), as more particularly described in the Lease;

(c) Landlord and Tenant have agreed to add certain space to the premises demised under the Lease, and to make certain other modifications to the Lease as set forth hereinbelow;

(d) All capitalized terms used in this Amendment that are not otherwise defined herein shall have the meanings ascribed to such terms in the Lease.

NOW, THEREFORE, in consideration of the mutual covenants contained herein, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Landlord and Tenant agree as follows:

1. Effective as of a date to be selected by Landlord and falling between May 1, 2018 and May 15, 2018 (the "Third Floor Expansion Date"), Landlord hereby leases to Tenant, and Tenant hereby leases from Landlord, Suite 300 (6,358 rsf), Suite 330 (546 rsf) and Suite 340 (202 rsf) in the Prizery (collectively, the "Third Floor Expansion Premises"), as outlined on Exhibit A attached hereto.

2. Base Rent with respect to the Third Floor Expansion Premises shall commence to be payable on the date which is three (3) months following the Third Floor Expansion Date (the "TFEP Rent Date"), and shall thereafter be as follows:

Period	Annual Base Rent per Rentable Square Foot (FS)	Monthly Rent
TFEP Rent Date – 2/28/19	$25.69	$15,212.76*
3/1/19 – 2/29/20	$26.39	$15,627.28
3/1/20 – 2/28/21	$27.12	$16,059.56
3/1/21 – 2/28/22	$27.87	$16,503.68
3/1/22 – 2/28/23	$28.63	$16,953.73
3/1/23 – 2/29/24	$29.42	$17,421.54
3/1/24 – 7/31/24	$30.23	$17,901.20

*prorated for any partial month

Notwithstanding anything in the foregoing to the contrary, provided no Event of Default then exists under the Lease, Landlord agrees to grant Tenant an abatement of the Base Rent due with respect to the Third Floor Expansion Premises, in an amount equal to $63,065.73. Such abatement shall be applied to the first monthly installments of Base Rent that would otherwise be due for the Third Floor Expansion Premises.

3. Tenant's Proportionate Share of Operating Expenses with respect to the Third Floor Expansion Premises is 20.92770% of the Prizery and 8.25647% of the Project. Tenant shall pay, with respect to the Third Floor Expansion Premises, from and after the thirtieth (30th) day following the Third Floor Expansion Date, its Proportionate Share of increases in Operating Expenses over the Operating Expenses incurred in calendar year 2017.

4. Landlord hereby agrees to grant Tenant an allowance ("Third Floor Improvements Allowance") with respect to the Third Floor Expansion Premises in the amount of $151,701.12. The Third Floor Improvements Allowance shall be applied toward the cost of the design and construction of any alterations Tenant desires to perform in the Third Floor Expansion Premises in conjunction with Tenant's initial occupancy of such Third Floor Expansion Premises. Any portion of the Third Floor Improvements Allowance may be applied to pay the fees of the architect and engineers and any construction supervision, contractors' overhead and profit charges, along with fees for any project manager employed by Tenant with respect to such alterations, as well as any licensing and permitting costs and fees.

The cost of Tenant's alterations in the Third Floor Expansion Premises shall be paid first out of the Third Floor Improvements Allowance until the Third Floor Improvements Allowance is exhausted. Tenant shall deliver to Landlord, no more frequently than once per month, invoices for work performed hereunder together with any other supporting documentation reasonably requested by Landlord. Provided no Event of Default then exists under the Lease, the Third Floor Improvements Allowance (or portions thereof) shall be disbursed to Tenant within thirty (30) days following Tenant's submission to Landlord of paid invoices for work related to alterations performed by Tenant in the Third Floor Expansion Premises, accompanied by waivers of liens executed by all contractors employed by Tenant for the performance of such work. If the cost of Tenant's alterations in the Third Floor Expansion Premises exceeds the amount of the Third Floor Improvements Allowance, the excess shall be paid by Tenant after the Third Floor Improvements Allowance is fully exhausted.

Any portion of the Third Floor Improvements Allowance that has not been utilized by the date that is twelve (12) months following the Third Floor Expansion Date shall revert to Landlord.

5. The parking rights granted to Tenant under the Lease shall increase proportionately upon the Third Floor Expansion Date.

6. Effective as of the "Dibrell Expansion Date" (as defined below), Landlord hereby leases to Tenant, and Tenant hereby leases from Landlord, approximately 2,848 rentable square feet of space in the Dibrell C building (collectively, the "Dibrell Expansion Premises"), as outlined on Exhibit B attached hereto. In the event the final BOMA calculation of the rentable area of the Dibrell Expansion Premises discloses that the rentable area of such space is less than 2,848 rentable square feet, the Monthly Rent set forth in Paragraph 7 below and Tenant's Proportionate Share of Operating Expenses with respect to the Dibrell Expansion Premises set forth in Paragraph 8 below shall be reduced pro rata. The "Dibrell Expansion Date" shall be the date following the date that the current tenant of a portion of the Dibrell Expansion Premises, One Cow Standing, LLC, vacates the space occupied by such tenant, so that the space may be delivered by Landlord to Tenant. The Dibrell Expansion Date is anticipated to occur on April 1, 2020, but Landlord shall have no liability to Tenant and this Amendment shall not be rendered void or voidable in the event Landlord is unable to deliver possession of the Dibrell Expansion Premises to Tenant by the anticipated Dibrell Expansion Date because the current tenant fails to vacate by such date (despite Landlord's commercially reasonable efforts to achieve same). In the event the current tenant vacates the Dibrell Expansion Premises prior to the anticipated Dibrell Expansion Date (such vacancy Landlord shall use commercially reasonable efforts to notify Tenant of at least thirty (30) days in advance), the Dibrell Expansion Date shall be the 90th day following the date that Landlord delivers possession of the Dibrell Expansion Premises to Tenant (in good and tenantable condition, broom clean, with all systems serving same in good working order). Landlord and Tenant agree to reasonably document (via e-mail or otherwise in writing) the Dibrell Expansion Date, for the avoidance of confusion or misunderstanding.

7. Base Rent with respect to the Dibrell Expansion Premises shall commence to be payable on the date which is three months following the Dibrell Expansion Date, and shall thereafter be as follows:

Period	Annual Base Rent per Rentable Square Foot (NNN)	Monthly Rent
4/1/20 – 3/31/21	$20.88	$4,955.52
4/1/21 – 3/31/22	$21.46	$5,093.17
4/1/22 – 3/31/23	$22.05	$5,233.20
4/1/23 – 3/31/24	$22.65	$5,375.60
4/1/24 – 7/31/24	$23.28	$5,525.12

The foregoing rent schedule presumes that the Dibrell Expansion Date will be no earlier than April 1, 2020. In the event the Dibrell Expansion Date occurs earlier than April 1, 2020, then (i) Annual

Base Rent for any period falling between April 1, 2018 and March 31, 2019 for which rent is payable with respect to the Dibrell Expansion Premises shall be calculated based upon an annual rate of $19.78 per rentable square foot, and (ii) Annual Base Rent for any period falling between April 1, 2019 and March 31, 2020 for which rent is payable with respect to the Dibrell Expansion Premises shall be calculated based upon an annual rate of $20.32 per rentable square foot.

Notwithstanding anything in the foregoing to the contrary, provided no Event of Default then exists under the Lease, Landlord agrees to grant Tenant an abatement of the Base Rent due with respect to the Dibrell Expansion Premises, in an amount equal to the product of (i) five (5) monthly installments of the Base Rent initially applicable to the Dibrell Expansion Premises multiplied by (ii) a fraction, the numerator of which is the number of full calendar months remaining in the Term of the Lease as of the Dibrell Expansion Date and the denominator of which is eighty-nine (89). Such abatement shall be applied to the first monthly installments of Base Rent that would otherwise be due for the Dibrell Expansion Premises.

8. Tenant's Proportionate Share of Operating Expenses with respect to the Dibrell Expansion Premises is 14.19% of Dibrell C and 3.30909% of the Project. Tenant shall pay, with respect to the Dibrell Expansion Premises, from and after the thirtieth (30th) day following the Dibrell Expansion Date, its Proportionate Share of increases in Operating Expenses over the Operating Expenses incurred in calendar year 2017.

9. Landlord hereby agrees to grant Tenant an allowance ("Dibrell Improvements Allowance") with respect to the Dibrell Expansion Premises in an amount (per rentable square foot in the Dibrell Expansion Premises) equal to the product of (i) $45.00 multiplied by (ii) a fraction, the numerator of which is the number of full calendar months remaining in the Term of this Lease as of the Dibrell Expansion Date and the denominator of which is eighty-nine (89). The Improvements Allowance shall be applied toward the cost of the design and construction of any alterations Tenant desires to perform in the Dibrell Expansion Premises in conjunction with Tenant's initial occupancy of such Dibrell Expansion Premises. Any portion of the Dibrell Improvements Allowance may be applied to pay the fees of the architect and engineers and any construction supervision, contractors' overhead and profit charges, along with fees for any project manager employed by Tenant with respect to such alterations, as well as any licensing and permitting costs and fees.

The cost of Tenant's alterations in the Dibrell Expansion Premises shall be paid first out of the Dibrell Improvements Allowance until the Dibrell Improvements Allowance is exhausted. Tenant shall deliver to Landlord, no more frequently than once per month, invoices for work performed hereunder together with any other supporting documentation reasonably requested by Landlord. Provided no Event of Default then exists under the Lease, the Dibrell Improvements Allowance (or portions thereof) shall be disbursed to Tenant within thirty (30) days following Tenant's submission to Landlord of paid invoices for work related to alterations performed by Tenant in the Dibrell Expansion Premises, accompanied by waivers of liens executed by all contractors employed by Tenant for the performance of such work. If the cost of Tenant's alterations in the Dibrell Expansion Premises exceeds the amount of the Dibrell Improvements Allowance, the excess shall be paid by Tenant after the Dibrell Improvements Allowance is fully exhausted.

Any portion of the Dibrell Improvements Allowance that has not been utilized by the date that is twelve (12) months following the Dibrell Expansion Date shall revert to Landlord.

10. The parking rights granted to Tenant under the Lease shall increase proportionately upon the Dibrell Expansion Date.

11. Landlord acknowledges that it is currently still working with Tenant to resolve certain HVAC issues, and will continue to work together with Tenant in good faith to accommodate Tenant's laboratory requirements related to same.

12. Landlord and Tenant further anticipate that, as previously discussed, a small amount of space may be added to the Dibrell Expansion Premises, after execution of this Amendment (and the parties agree that such space shall be subject to all economic terms and conditions of Section 7, 8, and 9 of this Amendment) To the extent reasonably requested by Landlord or Tenant, the parties shall enter into a confirmatory amendment or side letter after such space is added.

13. Landlord and Tenant each warrant to the other that in connection with this Amendment neither has employed or dealt with any broker, agent or finder, other than CBRE-Raleigh, LLC and Cushman & Wakefield (the "Brokers"). Landlord acknowledges that it shall pay any commission or fee due to the Brokers, pursuant to a separate written agreement. Each party shall indemnify and hold the other harmless from and against any claim for brokerage or other commissions asserted by any broker, agent or finder employed by the indemnifying party or with whom the indemnifying party has dealt, other than the Brokers.

14. As modified by this Amendment, the Lease continues in full force and effect.

IN WITNESS WHEREOF, Landlord and Tenant have executed and delivered this Amendment as of the day and year first above written.

WITNESS:

Illegible

LANDLORD:

VENABLE CENTER, LLC

By: /s/ Esko I. Korhonen

Title President

WITNESS:

/s/ Renee Cramer

TENANT:

PRECISION BIOSCIENCES, INC.

By: /s/ Todd Melby

Title: COO

EXHIBIT A

FLOOR PLAN OF THIRD FLOOR EXPANSION PREMISES (Suite 300 & Suite 340)

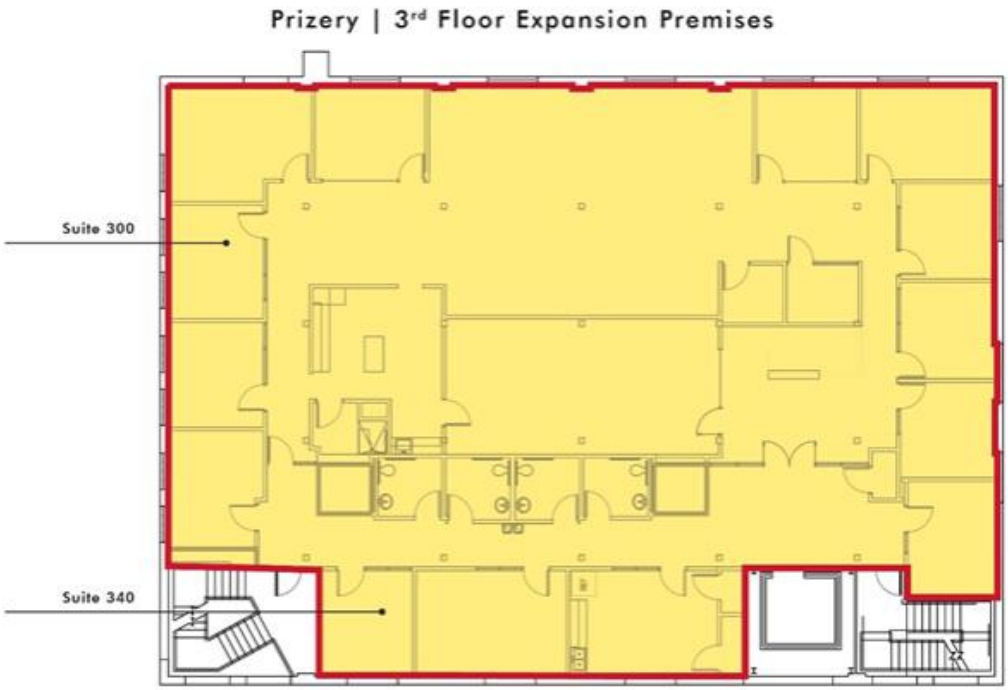
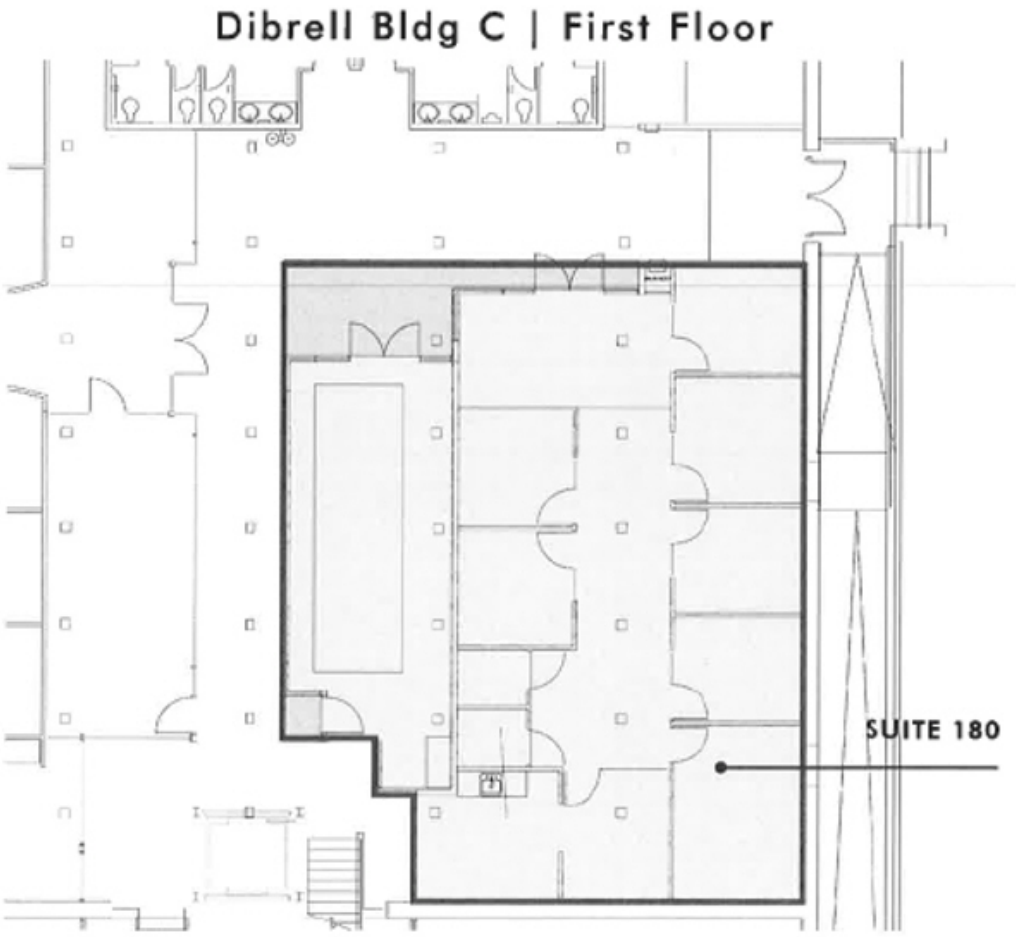


EXHIBIT B

FLOOR PLAN OF DIBRELL EXPANSION PREMISES



SIXTH AMENDMENT TO LEASE AGREEMENT

THIS SIXTH AMENDMENT TO LEASE AGREEMENT (this "Amendment") is made as of the 06 day of August, 2018 by and between **VC OWNER, LLC**, a North Carolina limited liability company ("Landlord"), and **PRECISION BIOSCIENCES, INC.**, a Delaware corporation ("Tenant"), with respect to the following recitals:

A. Pursuant to that certain Lease Agreement dated April 5, 2010, as modified by a First Amendment to Lease Agreement dated August 19, 2011, and by a Second Amendment to Lease Agreement dated July 13, 2015, and by a Third Amendment to Lease Agreement dated January 12, 2016, and by a Fourth Amendment to Lease Agreement dated September 30, 2016, and by a Fifth Amendment to Lease Agreement dated January 24, 2018 (collectively, the "Lease"), Landlord (as successor to Venable Tenant LLC) leases to Tenant certain office space in the group of interconnected buildings situated at 302 East Pettigrew Street, Durham, North Carolina known collectively as "Venable Center" (the "Project"), as more particularly described in the Lease;

B. Landlord and Tenant have agreed to add certain space to the premises demised under the Lease, and to make certain other modifications to the Lease as set forth hereinbelow;

C. All capitalized terms used in this Amendment that are not otherwise defined herein shall have the meanings ascribed to such terms in the Lease.

NOW, THEREFORE, in consideration of the mutual covenants contained herein, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Landlord and Tenant agree as follows:

1. Landlord hereby leases to Tenant, and Tenant hereby leases from Landlord, approximately 1,626 rentable square feet of space known as Suite C-185 (the "Suite C-185 Premises") in the Dibrell Building (the "Building") in the Project, as outlined on Exhibit A attached hereto. The Term of the Lease with respect to the Suite C-185 Premises shall commence as of September 1, 2018, and shall be coterminous with the Term applicable to the remainder of the Premises. From and after September 1, 2018, the Suite C-185 Premises shall constitute a portion of the "Premises" for all purposes under the Lease. Landlord shall have no liability to Tenant in the event Landlord is unable to deliver possession of the Suite C-185 Premises to Tenant on September 1, 2018 due to the holding over by the prior tenant thereof or due to any other matter beyond Landlord's reasonable control; however, in such event, rent with respect to the Suite C-185 Premises will not begin to accrue until the first business day after Landlord is able to deliver possession of the Suite C-185 Premises to Tenant, broom clean and free of any prior tenancy.

2. From and after September 1, 2018, Tenant shall pay monthly Base Rent with respect to the Suite C-185 Premises in the amount of $3,929.50 per month, which amount shall escalate by 3.0% per annum on September 1, 2019 and each September 1st thereafter. Notwithstanding the foregoing, provided Tenant is not then in default under the Lease beyond any applicable notice and cure period, Landlord agrees to abate the first four (4) monthly installments of Base Rent with respect to the Suite C-185 Premises (only).

3. Commencing on January 1, 2019, Tenant shall pay Additional Rent with respect to the Suite C-185 Premises pursuant to Section 6 of the Lease. With respect to the Suite C-185 Premises (only), Tenant's Proportionate Share shall be 3.14714% for the Building and 1.89723% for the Project, and Tenant shall pay its Proportionate Share of increases in Operating Expenses over the Operating Expenses incurred in calendar year 2018.

4. Tenant shall accept the Suite C-185 Premises in their "as is" condition (subject to Landlord's continuing repair and maintenance obligations, as outlined in Section 10 of the Lease (as may be amended)), and Landlord shall have no obligation to make any alterations or improvements thereto whatsoever. Any alterations that Tenant desires to make in the Suite C-185 Premises shall be subject to all the terms and conditions set forth in Section 11 of the Lease. Landlord hereby agrees to grant Tenant an allowance (the "Granted Allowance") in the amount of $32,520.00, to be applied toward the cost (including architectural and engineering fees) of alterations performed by Tenant in the Suite C-185 Premises. The Granted Allowance will be disbursed to Tenant within thirty (30) days following Tenant's submission to Landlord of paid invoices with respect to such alterations, together with lien releases from Tenant's contractor(s) and any other supporting documentation reasonably required by Landlord. Any portion of the Granted Allowance that has not been applied (or contracted to be applied) in the manner set forth above by March 1, 2019 shall revert to Landlord, and Tenant shall have no further rights with respect thereto.

5. Concurrently with its execution of this Amendment, Tenant shall deliver to Landlord the sum of $3,929.50, which shall be added to Tenant's existing Security Deposit, and which combined sum shall continue to be held by Landlord throughout the Term pursuant to the provisions of Section 9 of the Lease.

6. Landlord and Tenant each warrant to the other that in connection with this Amendment neither has employed or dealt with any broker, agent or finder, other than CBRE-Raleigh, LLC and Cushman & Wakefield (the "Brokers"). Landlord acknowledges that it shall pay any commission or fee due to the Brokers, pursuant to a separate written agreement. Each party shall indemnify and hold the other harmless from and against any claim for brokerage or other commissions asserted by any broker, agent or finder employed by the indemnifying party or with whom the indemnifying party has dealt, other than the Brokers.

7. This Amendment and all provisions contained herein are contingent upon an executed lease termination agreement between Landlord and the existing tenant ("RS&H, Inc.") for the Suite C-185 Premises, providing that the Suite C-185 Premises shall be surrendered to Landlord on or before August 31, 2018 (the "RS&H Termination Agreement"). If Landlord does not enter into said RS&H Termination Agreement within fifteen (15) days of the date of full execution of this Amendment, then Tenant shall be entitled to terminate this Amendment (and all of its obligations hereunder) by written notice delivered to Landlord within thirty (30) days following the date of full execution of this Amendment (unless Landlord has entered into the RS&H Termination Agreement prior to Tenant's delivery of its termination notice, in which event this Amendment shall remain in force and effect).

8. As modified by this Amendment, the Lease continues in full force and effect.

IN WITNESS WHEREOF, Landlord and Tenant have executed and delivered this Amendment as of the day and year first above written.

WITNESS:

Illegible

LANDLORD:

VC OWNER, LLC

By: /s/ Jeff Sheehan

Title: Authorized Signatory

WITNESS:

/s/ Matt Kane

TENANT:

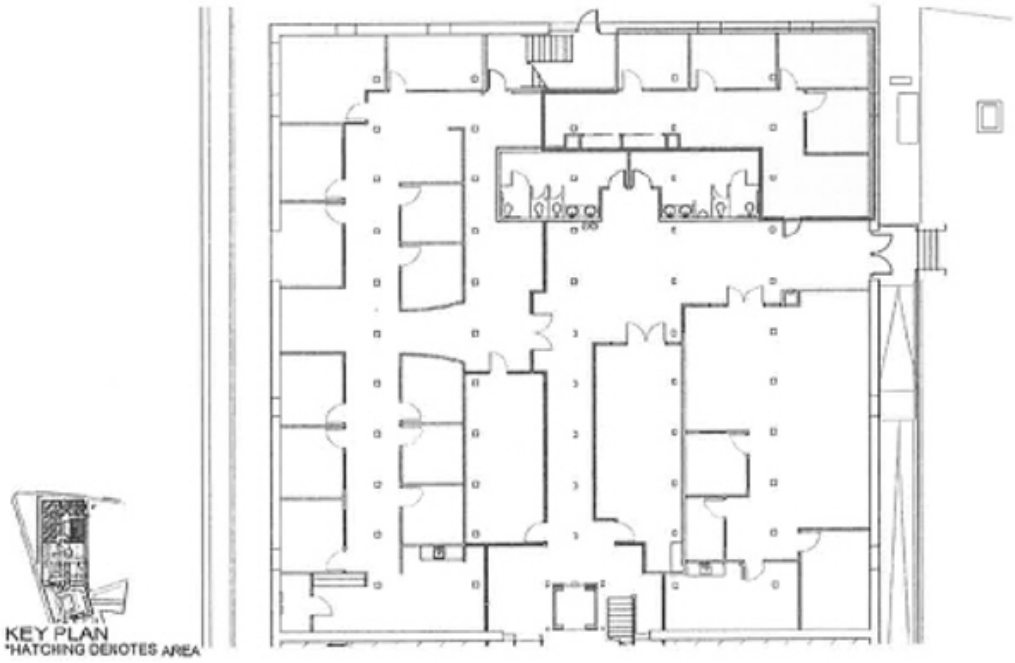
PRECISION BIOSCIENCES, INC.

By: Matt Kane

Title: CEO

EXHIBIT A

FLOOR PLAN OF SUITE C-185 PREMISES



AMENDED AND RESTATED SEVENTH AMENDMENT TO LEASE AGREEMENT

THIS **AMENDED AND RESTATED SEVENTH AMENDMENT TO LEASE AGREEMENT** (this "Amendment") is made as of the day of February, 2019 (the "Effective Date") by and between **VC OWNER, LLC**, a Delaware limited liability company ("Landlord"), and **PRECISION BIOSCIENCES, INC.**, a Delaware corporation ("Tenant"), with respect to the following recitals:

A. Pursuant to that certain Lease Agreement dated April 5, 2010, as modified by a First Amendment to Lease Agreement dated August 19, 2011, and by a Second Amendment to Lease Agreement dated July 13, 2015, and by a Third Amendment to Lease Agreement dated January 12, 2016, and by a Fourth Amendment to Lease Agreement dated September 30, 2016 (the "Fourth Amendment"), and by a Fifth Amendment to Lease Agreement dated January 24, 2018 (the "Fifth Amendment"), by a Sixth Amendment to Lease Agreement dated August 6, 2018, and by a Seventh Amendment to Lease Agreement (the "Seventh Amendment") dated November 14, 2018 (collectively, the "Lease"), Landlord (as successor to Venable Tenant LLC) leases to Tenant certain office space in the group of interconnected buildings situated at 302 East Pettigrew Street, Durham, North Carolina known collectively as "Venable Center" (the "Project"), as more particularly described in the Lease;

B. Landlord and Tenant have agreed to add certain space to the premises demised under the Lease, to amend, restate, supersede, and replace that certain Seventh Amendment, and to make certain other modifications to the Lease as set forth hereinbelow; and

C. All capitalized terms used in this Amendment that are not otherwise defined herein shall have the meanings ascribed to such terms in the Lease.

NOW, THEREFORE, in consideration of the mutual covenants contained herein, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Landlord and Tenant agree as follows:

1. *Premises*. Subject to Section 7 of this Amendment, Landlord hereby leases to Tenant, and Tenant hereby leases from Landlord, (i) approximately 7,416 rentable square feet of space known as Suite WB100 (the "Suite WB100 Premises") in Dibrell B, which is located within the Dibrell Building (the "Building") in the Project, as outlined on Exhibit A-1 attached hereto and incorporated herein and (ii) approximately 7,416 rentable square feet of space known as Suite WB200 (the "Suite WB200 Premises", together with the Suite WB100 Premises, collectively, the "Premises") in the Building in the Project, as outlined on Exhibit A-2 attached hereto and incorporated herein. The Term of the Lease with respect to the Suite WB100 Premises shall commence as of March 1, 2019 (the "Suite WB100 Premises Seventh Amendment Commencement Date") and shall be coterminous with the Term applicable to the remainder of the Premises. The Term of the Lease with respect to the Suite WB200 Premises shall commence as of May 1, 2019 (the "Suite WB200 Premises Seventh Amendment Commencement Date", together with the Suite WB100 Premises Seventh Amendment Commencement Date, collectively, the "Seventh Amendment Commencement Date") and shall be coterminous with the Term applicable to the remainder of the Premises. From and after the Suite WB100 Premises Seventh Amendment Commencement Date and the Suite WB200 Premises Seventh Amendment Commencement Date, respectively, the Suite WB100 Premises and the Suite WB200 Premises, respectively, shall constitute a portion of the "Premises" for all purposes under the Lease. Landlord shall have no liability to Tenant in the event Landlord is unable to deliver possession of the Suite WB100 Premises and the Suite WB200 Premises to Tenant on the Suite WB100 Premises Seventh Amendment Commencement Date and the Suite WB200 Premises Seventh Amendment Commencement Date, respectively, due to the holding over by the prior tenants thereof or due to any other matter beyond Landlord's reasonable control (and further provided that Landlord shall use commercially reasonable efforts to enforce its rights under the existing lease agreements as modified by the Amended and Restated Lease

Termination Agreement, as hereinafter defined); however, in such event, Base Rent with respect to the Suite WB100 Premises and the Suite WB200 Premises, respectively, will not begin to accrue until the first business day after Landlord is able to deliver possession of the Suite WB100 Premises and the Suite WB200 Premises to Tenant, broom clean and free of any prior tenancy.

As of the Effective Date, the Suite WB100 Premises and the Suite WB200 Premises are occupied collectively by Hutson Law Office, P.A. ("Hutson Law") and Richard M. Hutson II, Chapter 13 Standing Trustee ("Chapter 13") with Hutson Law occupying a portion of Suite WB200 Premises in premises known as of the Effective Date as Suite B-260 and with Chapter 13 occupying Suite WB100 Premises and a portion of Suite WB200 Premises in premises known as of the Effective Date as Suite B-140. For purposes of clarity, as of the Seventh Amendment Commencement Date, the suites designated as of the Effective Date as Suite B-140 and Suite B-260 shall no longer have such designations and such premises shall be reconfigured and thereafter be known as Suite WB100 Premises and Suite WB200 Premises. Additionally, for purposes of clarity, Suite WB100 Premises is referred to in the Fourth Amendment as DB First Floor Expansion Premises and Suite WB200 Premises is referred to in the Fourth Amendment as DB Second Floor Expansion Premises.

2. *Rent*.

(a) *Suite WB100 Premises*. Except as set forth in Section 2(c) hereof, from the Suite WB100 Premises Seventh Amendment Commencement Date until the 90th day thereafter (the "100 Rent Commencement Date"), Tenant shall not be obligated to pay Base Rent or Operating Expenses with respect to the Suite WB100 Premises while it constructs the tenant improvements in Suite WB100 Premises. From and after the 100 Rent Commencement Date, Tenant shall pay Base Rent with respect to the Suite WB100 Premises only in accordance with the following rent table:

Period	Rate	Annual Base Rent	Monthly Base Rent
100RCD*– January 31, 2020	$20.32	N/A	$12,557.76**
February 1, 2020 – January 31, 2021	$20.88	$154,846.08	$12,903.84
February 1, 2021 – January 31, 2022	$21.46	$159,147.36	$13,262.28
February 1, 2022 – January 31, 2023	$22.05	$163,522.80	$13,626.90
February 1, 2023 – January 31, 2024	$22.65	$167,972.40	$13,997.70
February 1, 2024 – July 31, 2024	$23.28	N/A	$14,387.04

*100 Rent Commencement Date.

**Notwithstanding anything in the Lease to the contrary (and specifically deleting the reference to the abatement of Base Rent for the DB First Floor Expansion Premises set forth in Section 3 of the Fourth Amendment), Landlord will forebear the obligation of Tenant to pay Base Rent only for the first three (3) months following the 100 Rent Commencement Date and a portion of the fourth (4th) month following the 100 Rent Commencement Date in the total amount of $39,831.14 (the "Suite WB100 Abated Payments").

(b) *Suite WB200 Premises*. Except as set forth in Section 2(c) hereof, from the Suite WB200 Premises Seventh Amendment Commencement Date until the 30th day thereafter (the "200 Rent Commencement Date"), Tenant shall not be obligated to pay Base Rent or Operating Expenses with respect to the Suite WB200 Premises while it constructs the tenant improvements in Suite WB200 Premises. From and after the 200 Rent Commencement Date, Tenant shall pay Base Rent with respect to the Suite WB200 Premises only in accordance with the following rent table:

Period	Rate	Annual/Periodic Base Rent	Monthly Base Rent
200RCD* – March 31, 2020	$26.39	N/A	$16,309.02**
April 1, 2020 – March 31, 2021	$27.12	$201,121.92	$16,760.16
April 1, 2021 – March 31, 2022	$27.87	$206,683.92	$17,223.66
April 1, 2022 – March 31, 2023	$28.63	$212,320.08	$17,693.34
April 1, 2023 – March 31, 2024	$29.42	$218,178.72	$18,181.56
April 1, 2024 – July 31, 2024	$30.23	N/A	$18,682.14

*200 Rent Commencement Date

**Notwithstanding anything in the Lease to the contrary (and specifically deleting the reference to the abatement of Base Rent for the DB Second Floor Expansion Premises set forth in Section 3 of the Fourth Amendment), Landlord will forebear the obligation of Tenant to pay Base Rent only for the first three (3) months following the 200 Rent Commencement Date and a portion of the fourth (4th) month following the 200 Rent Commencement Date in the total amount of $52,078.65 (the "Suite WB200 Abated Payments").

(c) As a part of Tenant's willingness to incentivize Hutson Law and Chapter 13's early terminations of the Premises in order to facilitate Tenant's own leasing of the Premises, Tenant has agreed to pay a portion of the rent payments owed by Hutson Law and Chapter 13 to Landlord for the Premises. Notwithstanding anything in the Lease to the contrary, Landlord and Tenant hereby acknowledge and agree that Tenant shall make the following payments for the Premises to Landlord on or before the following dates:

Payment Due Date	Amount Due
March 1, 2019	$12,557.76
April 1, 2019	$12,557.76
May 1, 2019	$28,866.78
June 1, 2019	$28,866.78

3. *Additional Rent*.

(a) *Suite WB100 Premises*. Commencing on the 100 Rent Commencement Date, Tenant shall pay Additional Rent with respect to the Suite WB100 Premises pursuant to Section 6 of the Lease. With respect to the Suite WB100 Premises only, Tenant's Proportionate Share shall be (i) 14.36179%, which is the ratio of 7,416 (the rentable square footage of the Suite WB100 Premises) to 51,637 (the rentable square footage of the Building) for the Building, and (ii) 8.66436%, which is the ratio of 7,416 (the rentable square footage of the Suite WB100 Premises) to 85,592 (the rentable square footage of the Project) for the Project. Notwithstanding anything in the Lease to the contrary, with respect to the Suite WB100 Premises only, the Base Rent is a "triple-net" rental rate, and Tenant shall pay its Proportionate Share of all Operating Expenses from and after the Suite WB100 Premises Seventh Amendment Commencement Date. For purposes of clarity, the percentages set forth in the table in Section 6 of the Fourth Amendment for Tenant's Proportionate Share of the Building and Tenant's Proportionate Share of Project for DB First Floor Expansion Premises are hereby deleted in their entirety.

(b) *Suite WB200 Premises*. Commencing on the 200 Rent Commencement Date, Tenant shall pay Additional Rent with respect to the Suite WB200 Premises pursuant to Section 6 of the Lease. With respect to the Suite WB200 Premises (only), Tenant's Proportionate Share shall be (i) 14.36179%, which is the ratio of 7,416 (the rentable square footage of the Suite WB200 Premises) to 51,637 (the rentable square footage of the Building) for the Building, and (ii) 8.66436%, which is the ratio of 7,416 (the rentable

square footage of the Suite WB200 Premises) to 85,592 (the rentable square footage of the Project) for the Project. Notwithstanding anything in the Lease to the contrary, with respect to the Suite WB200 Premises only, the Base Rent is a modified "full-service" rental rate, and commencing on the Suite WB200 Premises Seventh Amendment Commencement Date, Tenant shall pay its Proportionate Share of increases in Operating Expenses over the Operating Expenses incurred in calendar year 2017. For purposes of clarity, the percentages set forth in the table in Section 6 of the Fourth Amendment for the Tenant's Proportionate Share of the Building and Tenant's Proportionate Share of Project for DB Second Floor Expansion Premises are hereby deleted in their entirety.

4. *Tenant Improvements*. Subject to this Section 4, Tenant shall accept the Suite WB100 Premises and Suite WB200 Premises in their "as is" condition (subject to Landlord's continuing repair and maintenance obligations, as outlined in Section 10 of the Lease (as may be amended)), and Landlord shall have no obligation to make any alterations or improvements thereto whatsoever (provided that Landlord shall deliver same in good and tenantable condition, broom clean, with all systems serving same in good working order). Any alterations that Tenant desires to make in the Suite WB100 Premises and Suite WB200 Premises shall be subject to all the terms and conditions set forth in Section 11 of the Lease. Notwithstanding anything in the Lease to the contrary (and specifically deleting the references to the Improvements Allowances (as defined in Section 7 of the Fourth Amendment) for the DB First Floor Expansion Premises and the DB Second Floor Expansion Premises in Section 7 of the Fourth Amendment), Landlord hereby agrees to grant Tenant (i) an allowance in the amount of $217,480.45 (i.e. $29.33 per rentable square foot multiplied by 7,416 rentable square feet) (the "Suite WB100 Granted Allowance") to be applied toward the cost (including architectural and engineering fees) of alterations performed by Tenant in the Suite WB100 Premises and (ii) an allowance in the amount of $124,988.76 (the "Suite WB200 Granted Allowance", together with the Suite WB100 Granted Allowance, collectively, the "Granted Allowance") to be applied toward the cost of the design and construction of any alterations Tenant desires to perform in Suite WB100 Premises and Suite WB200 Premises, respectively, in conjunction with Tenant's initial occupancy of Suite WB100 Premises and Suite WB200. Any portion of the Granted Allowance may be applied to pay the fees of the architect and engineers and any construction supervision, contractors' overhead and profit charges, along with fees for any project manager employed by Tenant with respect to such alterations, as well as any licensing and permitting costs and fees; provided, the Suite WB100 Granted Allowance may only be used for the Suite WB100 Premises and the Suite WB200 Granted Allowance may only be used for the Suite WB200 Premises.

The cost of Tenant's alterations in the Suite WB100 Premises shall be paid first out the Suite WB100 Granted Allowance until the Suite WB100 Granted Allowance is exhausted (at which time Tenant shall be fully responsible for the cost of any further alterations), and the cost of Tenant's alteration in the Suite WB200 Premises shall be paid first out the Suite WB200 Granted Allowance until the Suite WB200 Allowance is exhausted (at which time Tenant shall be fully responsible for the cost of any further alterations). Provided no Event of Default then exists under the Lease, the Granted Allowance (or portions thereof) shall be disbursed to Tenant within thirty (30) days following Tenant's submission to Landlord of paid invoices for work related to alterations performed by Tenant in the Suite WB100 Premises and Suite WB200 Premises, accompanied by waivers of liens executed by all contractors employed by Tenant for the performance of such work. If the cost of Tenant's alterations in the Suite WB100 Premises or the Suite WB200 Premises exceeds the amount of the Suite WB100 Granted Allowance or the Suite WB200 Granted Allowance, the excess shall be paid by Tenant after the Suite WB100 Granted Allowance or the Suite WB200 Granted Allowance is fully exhausted. Any portion of the (i) Suite WB100 Granted Allowance that has not been applied (or contracted to be applied) in the manner set forth above by the date which is twelve (12) months following the Suite WB100 Premises Seventh Amendment Commencement Date shall revert to Landlord, and Tenant shall have no further rights with respect thereto and (ii) Suite WB200 Granted Allowance that has not been applied (or contracted to be applied) in the manner set forth above by the date which is twelve (12) months following the Suite WB200 Premises Seventh Amendment Commencement Date shall revert to Landlord, and Tenant shall have no further rights with respect thereto.

5. *Security Deposit*. Concurrently with its execution of this Amendment, Tenant shall deliver the sum of $28,434.18 to Landlord as an additional portion of the Security Deposit, and accordingly the Security Deposit shall be increased by $28,434.18, which shall be held by Landlord throughout the Term pursuant to the provisions of Section 9 of the Lease.

6. *Brokers*. Landlord and Tenant each warrant to the other that in connection with this Amendment neither has employed or dealt with any broker, agent or finder, other than CBRE -Raleigh, LLC (the "Landlord's Broker") and Cushman & Wakefield (the "Tenant's Broker", together with Landlord's Broker, collectively, "Brokers"). Landlord acknowledges that it shall pay any commission or fee due to the Landlord's Broker, pursuant to a separate written agreement. Landlord's Broker shall pay any commission or fee due to Tenant's Broker, pursuant to a separate written agreement. Each party shall indemnify and hold the other harmless from and against any claim for brokerage or other commissions asserted by any broker, agent or finder employed by the indemnifying party or with whom the indemnifying party has dealt, other than the Brokers.

7. *Contingency*. This Amendment and all provisions contained herein are contingent upon (i) an executed amended and restated lease termination agreement between Landlord and Hutson Law for the premises that Hutson Law leases from Landlord (the "Amended and Restated Hutson Law Lease Termination Agreement") and (ii) an executed amended and restated lease termination agreement between Landlord and Chapter 13 for the premises that Chapter 13 leases from Landlord (the "Amended and Restated Chapter 13 Lease Termination Agreement", together with the Amended and Restated Hutson Law Lease Termination Agreement, collectively, the "Amended and Restated Lease Termination Agreement"), providing that the Suite WB100 Premises and the Suite WB200 Premises shall be surrendered to Landlord on or before February 28, 2019 or April 30, 2019, respectively, in accordance with the Amended and Restated Lease Termination Agreement. In the event Landlord does not obtain the Amended and Restated Lease Termination Agreement by February 28, 2019, Landlord or Tenant shall thereafter have the right to terminate this Amendment (prior to date of receipt of a fully executed Amended and Restated Lease Termination Agreement).

8. *Notices*. The Landlord notice information and payment information in Section 29(b) of the Lease is hereby deleted in its entirety and replaced with the following:

For Notice Information:

Landlord: VC Owner, LLC
c/o Trinity Capital Advisors
440 S. Church Street, Suite 800
Charlotte, NC 28202
Attn: Asset Manager

With a copy to: Longleaf Law Partners
2235 Gateway Access Point, Suite 201
Raleigh, NC 27607
Attnention: L. Penn Clarke

For Payment Information:

Landlord: VC Owner, LLC
c/o TP Triangle
3020 Carrington Mill Blvd., Suite 425
Morrisville, NC 27560

9. *Acknowledgement*. Landlord and Tenant acknowledge that, to their actual knowledge, each party has complied with all of its obligations under the Lease to date, and, to the extent not expressly modified hereby, all of the terms and conditions of said Lease shall remain unchanged and in full force and effect.

10. *Seventh Amendment*. This Amendment amends, restates, supersedes and replaces that certain Seventh Amendment in its entirety.

11. *Dibrell Expansion Premises Clarification*. Sections 6 and 7 of the Fifth Amendment are clarified as follows: (i) the Dibrell Expansion Date is agreed to be June 1, 2018; (ii) Base Rent for the Dibrell Expansion Premises, from 1/1/2019 through 3/31/2020 shall be as follows:

1/1/2019 – 1/31/2019:	$3,708.62 (21% abatement)
2/1/2019 – 3/31/2019:	$4,694.45 per month
4/1/2019 – 3/31/2020:	$4,822.61 per month.

Beginning 4/1/2020, Base Rent for the Dibrell Expansion Premises shall follow the existing table in Section 7 of the Fifth Amendment.

12. *Miscellaneous*. The foregoing is intended to be an addition and a modification to the Lease. Except as modified and amended by this Amendment, the Lease shall remain in full force and effect. If anything contained in this Amendment conflicts with any terms of the Lease, then the terms of this Amendment shall govern and any conflicting terms in the Lease shall be deemed deleted in their entirety. Each party to this Amendment shall execute all instruments and documents and take such further action as may be reasonably required to effectuate the purposes of this Amendment. This Amendment may be modified only by a writing executed by the parties hereto. This Amendment may be executed in multiple counterparts, each of which shall be deemed an original, and all such counterparts shall together constitute one and the same instrument. The invalidity of any portion of this Amendment shall not have any effect on the balance hereof. This Amendment shall be binding upon the parties hereto, as well as their successors, heirs, executors and assigns. This Amendment shall be governed by, and construed in accordance with North Carolina law.

[Remainder of this page intentionally left blank]

IN WITNESS WHEREOF, Landlord and Tenant have executed and delivered this Amendment as of the day and year first above written.

LANDLORD:

VC OWNER, LLC

By: /s/ Jeffrey B. Sheehan
Name: Jeffrey B. Sheehan
Title: Partner

TENANT:

PRECISION BIOSCIENCES, INC.

By: /s/ Matt Kane
Name: Matt Kane
Title: CEO

EXHIBIT A-1

FLOOR PLAN OF SUITE WB100 PREMISES

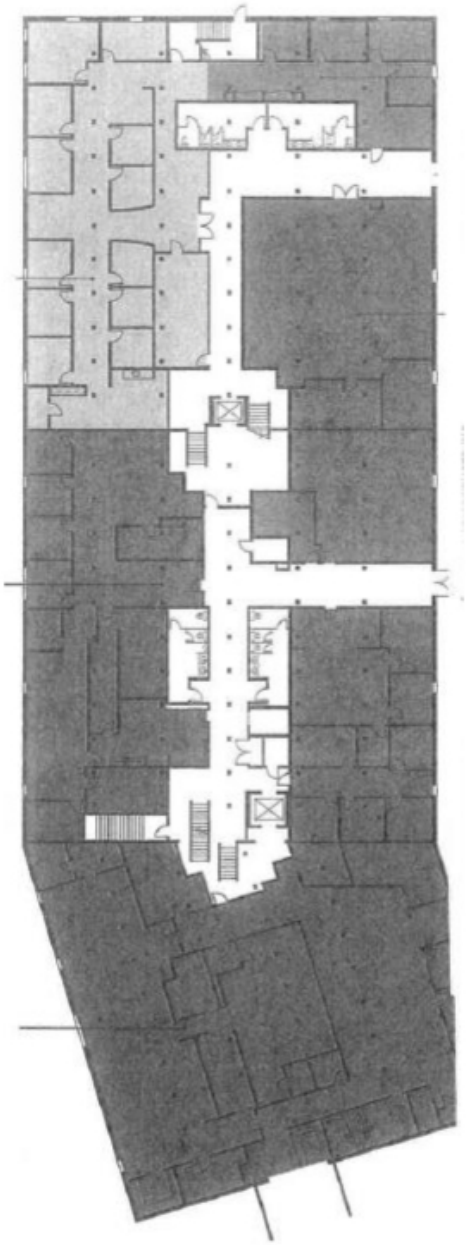
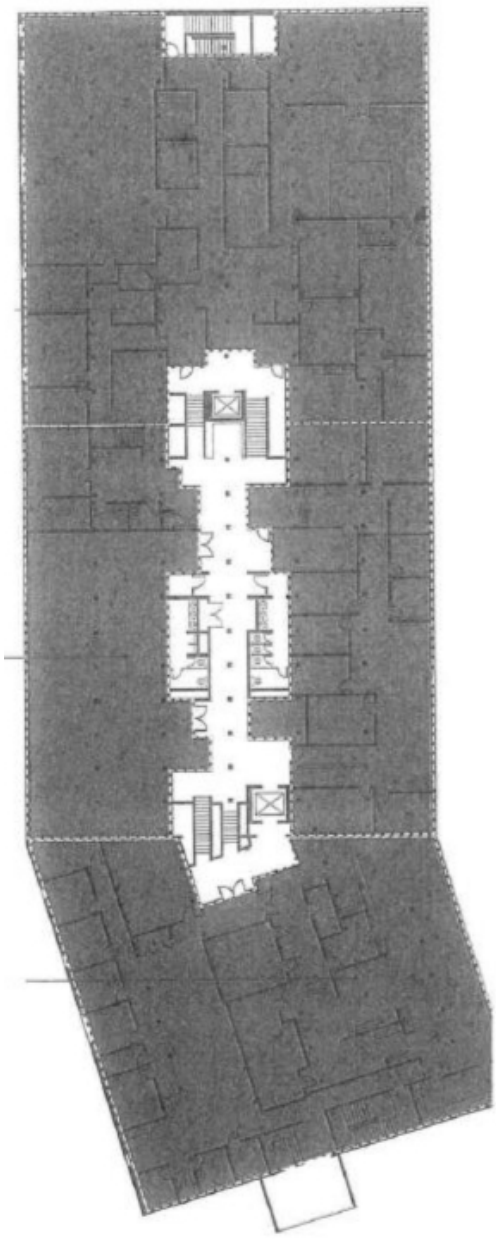


EXHIBIT A-2

FLOOR PLAN OF SUITE WB200 PREMISES



PRECISION BIOSCIENCES, INC.
2019 INCENTIVE AWARD PLAN

ARTICLE I.
PURPOSE

The Plan's purpose is to enhance the Company's ability to attract, retain and motivate persons who make (or are expected to make) important contributions to the Company by providing these individuals with equity ownership opportunities. Capitalized terms used in the Plan are defined in Article XI.

ARTICLE II.
ELIGIBILITY

Service Providers are eligible to be granted Awards under the Plan, subject to the limitations described herein.

ARTICLE III.
ADMINISTRATION AND DELEGATION

3.1 Administration. The Plan is administered by the Administrator. The Administrator has authority to determine which Service Providers receive Awards, grant Awards and set Award terms and conditions, subject to the conditions and limitations in the Plan. The Administrator also has the authority to take all actions and make all determinations under the Plan, to interpret the Plan and Award Agreements and to adopt, amend and repeal Plan administrative rules, guidelines and practices as it deems advisable. The Administrator may correct defects and ambiguities, supply omissions and reconcile inconsistencies in the Plan or any Award as it deems necessary or appropriate to administer the Plan and any Awards. The Administrator's determinations under the Plan are in its sole discretion and will be final and binding on all persons having or claiming any interest in the Plan or any Award.

3.2 Appointment of Committees. To the extent Applicable Laws permit, the Board may delegate any or all of its powers under the Plan to one or more Committees or officers of the Company or any of its Subsidiaries. The Board may abolish any Committee or re-vest in itself any previously delegated authority at any time.

ARTICLE IV.
STOCK AVAILABLE FOR AWARDS

4.1 Number of Shares. Subject to adjustment under Article VIII and the terms of this Article IV, Awards may be made under the Plan covering up to the Overall Share Limit. As of the Plan's effective date under Section 10.3, the Company will cease granting awards under the Prior Plans; however, Prior Plan Awards will remain subject to the terms of the applicable Prior Plan. Shares issued under the Plan may consist of authorized but unissued Shares, Shares purchased on the open market or treasury Shares.

4.2 Share Recycling. If all or any part of an Award or Prior Plan Award expires, lapses or is terminated, exchanged for cash, surrendered, repurchased, canceled without having been fully exercised or forfeited, in any case, in a manner that results in the Company acquiring Shares covered by the Award or Prior Plan Award at a price not greater than the price (as adjusted to reflect any Equity Restructuring) paid by the Participant for such Shares or not issuing any Shares covered by the Award or Prior Plan

Award, the unused Shares covered by the Award or Prior Plan Award will, as applicable, become or again be available for Award grants under the Plan. Further, Shares delivered (either by actual delivery or attestation) to the Company by a Participant to satisfy the applicable exercise or purchase price of an Award or Prior Plan Award and/or to satisfy any applicable tax withholding obligation (including Shares retained by the Company from the Award or Prior Plan Award being exercised or purchased and/or creating the tax obligation) will, as applicable, become or again be available for Award grants under the Plan. The payment of Dividend Equivalents in cash in conjunction with any outstanding Awards or Prior Plan Awards shall not count against the Overall Share Limit.

4.3 Incentive Stock Option Limitations. Notwithstanding anything to the contrary herein, no more than 5,000,000 Shares may be issued pursuant to the exercise of Incentive Stock Options.

4.4 Substitute Awards. In connection with an entity's merger or consolidation with the Company or the Company's acquisition of an entity's property or stock, the Administrator may grant Awards in substitution for any options or other stock or stock-based awards granted before such merger or consolidation by such entity or its affiliate. Substitute Awards may be granted on such terms as the Administrator deems appropriate, notwithstanding limitations on Awards in the Plan. Substitute Awards will not count against the Overall Share Limit (nor shall Shares subject to a Substitute Award be added to the Shares available for Awards under the Plan as provided above), except that Shares acquired by exercise of substitute Incentive Stock Options will count against the maximum number of Shares that may be issued pursuant to the exercise of Incentive Stock Options under the Plan. Additionally, in the event that a company acquired by the Company or any Subsidiary or with which the Company or any Subsidiary combines has shares available under a pre-existing plan approved by stockholders and not adopted in contemplation of such acquisition or combination, the shares available for grant pursuant to the terms of such pre-existing plan (as adjusted, to the extent appropriate, using the exchange ratio or other adjustment or valuation ratio or formula used in such acquisition or combination to determine the consideration payable to the holders of common stock of the entities party to such acquisition or combination) may be used for Awards under the Plan and shall not reduce the Shares authorized for grant under the Plan (and Shares subject to such Awards shall not be added to the Shares available for Awards under the Plan as provided above); provided that Awards using such available shares shall not be made after the date awards or grants could have been made under the terms of the pre-existing plan, absent the acquisition or combination, and shall only be made to individuals who were not Employees or Directors prior to such acquisition or combination.

4.5 Non-Employee Director Compensation. Notwithstanding any provision to the contrary in the Plan, the Administrator may establish compensation for non-employee Directors from time to time, subject to the limitations in the Plan. The Administrator will from time to time determine the terms, conditions and amounts of all such non-employee Director compensation in its discretion and pursuant to the exercise of its business judgment, taking into account such factors, circumstances and considerations as it shall deem relevant from time to time, provided that the sum of any cash compensation, or other compensation, and the value (determined as of the grant date in accordance with Financial Accounting Standards Board Accounting Standards Codification Topic 718, or any successor thereto) of Awards granted to a non-employee Director as compensation for services as a non-employee Director during any fiscal year of the Company may not exceed $750,000. The Administrator may make exceptions to this limit for individual non-employee Directors in extraordinary circumstances, as the Administrator may determine in its discretion, provided that the non-employee Director receiving such additional compensation may not participate in the decision to award such compensation or in other contemporaneous compensation decisions involving non-employee Directors.

ARTICLE V.
STOCK OPTIONS AND STOCK APPRECIATION RIGHTS

5.1 General. The Administrator may grant Options or Stock Appreciation Rights to Service Providers subject to the limitations in the Plan, including any limitations in the Plan that apply to Incentive Stock Options. The Administrator will determine the number of Shares covered by each Option and Stock Appreciation Right, the exercise price of each Option and Stock Appreciation Right and the conditions and limitations applicable to the exercise of each Option and Stock Appreciation Right. A Stock Appreciation Right will entitle the Participant (or other person entitled to exercise the Stock Appreciation Right) to receive from the Company upon exercise of the exercisable portion of the Stock Appreciation Right an amount determined by multiplying the excess, if any, of the Fair Market Value of one Share on the date of exercise over the exercise price per Share of the Stock Appreciation Right by the number of Shares with respect to which the Stock Appreciation Right is exercised, subject to any limitations of the Plan or that the Administrator may impose and payable in cash, Shares valued at Fair Market Value or a combination of the two as the Administrator may determine or provide in the Award Agreement.

5.2 Exercise Price. The Administrator will establish each Option's and Stock Appreciation Right's exercise price and specify the exercise price in the Award Agreement. The exercise price will not be less than 100% of the Fair Market Value on the grant date of the Option or Stock Appreciation Right.

5.3 Duration. Each Option or Stock Appreciation Right will be exercisable at such times and as specified in the Award Agreement, provided that the term of an Option or Stock Appreciation Right will not exceed ten years. Notwithstanding the foregoing, if the Participant, prior to the end of the term of an Option or Stock Appreciation Right, violates the non-competition, non-solicitation, confidentiality or other similar restrictive covenant provisions of any employment contract, confidentiality and nondisclosure agreement or other agreement between the Participant and the Company or any of its Subsidiaries, the right of the Participant and the Participant's transferees to exercise any Option or Stock Appreciation Right issued to the Participant shall terminate immediately upon such violation, unless the Company otherwise determines. In addition, if, prior to the end of the term of an Option or Stock Appreciation Right, the Participant is given notice by the Company or any of its Subsidiaries of the Participant's Termination of Service by the Company or any of its Subsidiaries for Cause, and the effective date of such Termination of Service is subsequent to the date of the delivery of such notice, the right of the Participant and the Participant's transferees to exercise any Option or Stock Appreciation Right issued to the Participant shall be suspended from the time of the delivery of such notice until the earlier of (i) such time as it is determined or otherwise agreed that the Participant's service as a Service Provider will not be terminated for Cause as provided in such notice or (ii) the effective date of the Participant's Termination of Service by the Company or any of its Subsidiaries for Cause (in which case the right of the Participant and the Participant's transferees to exercise any Option or Stock Appreciation Right issued to the Participant will terminate immediately upon the effective date of such termination of Service).

5.4 Exercise. Options and Stock Appreciation Rights may be exercised by delivering to the Company a written notice of exercise, in a form the Administrator approves (which may be electronic), signed by the person authorized to exercise the Option or Stock Appreciation Right, together with, as applicable, payment in full (i) as specified in Section 5.5 for the number of Shares for which the Award is exercised and (ii) as specified in Section 9.5 for any applicable taxes. Unless the Administrator otherwise determines, an Option or Stock Appreciation Right may not be exercised for a fraction of a Share.

5.5 Payment Upon Exercise. Subject to Section 10.8, any Company insider trading policy (including blackout periods) and Applicable Laws, the exercise price of an Option must be paid by:

(a) cash, wire transfer of immediately available funds or by check payable to the order of the Company, provided that the Company may limit the use of one of the foregoing payment forms if one or more of the payment forms below is permitted;

(b) if there is a public market for Shares at the time of exercise, unless the Company otherwise determines, (A) delivery (including telephonically to the extent permitted by the Company) of an irrevocable and unconditional undertaking by a broker acceptable to the Company to deliver promptly to the Company sufficient funds to pay the exercise price, or (B) the Participant's delivery to the Company of a copy of irrevocable and unconditional instructions to a broker acceptable to the Company to deliver promptly to the Company cash or a check sufficient to pay the exercise price; provided that such amount is paid to the Company at such time as may be required by the Administrator;

(c) to the extent permitted by the Administrator, delivery (either by actual delivery or attestation) of Shares owned by the Participant valued at their Fair Market Value;

(d) to the extent permitted by the Administrator, surrendering Shares then issuable upon the Option's exercise valued at their Fair Market Value on the exercise date;

(e) to the extent permitted by the Administrator, delivery of a promissory note or any other property that the Administrator determines is good and valuable consideration; or

(f) to the extent permitted by the Company, any combination of the above payment forms approved by the Administrator.

ARTICLE VI.
RESTRICTED STOCK; RESTRICTED STOCK UNITS

6.1 General. The Administrator may grant Restricted Stock, or the right to purchase Restricted Stock, to any Service Provider, subject to the Company's right to repurchase all or part of such shares at their issue price or other stated or formula price from the Participant (or to require forfeiture of such shares) if conditions the Administrator specifies in the Award Agreement are not satisfied before the end of the applicable restriction period or periods that the Administrator establishes for such Award. In addition, the Administrator may grant to Service Providers Restricted Stock Units, which may be subject to vesting and forfeiture conditions during the applicable restriction period or periods, as set forth in an Award Agreement. The Administrator will determine and set forth in the Award Agreement the terms and conditions for each Restricted Stock and Restricted Stock Unit Award, subject to the conditions and limitations contained in the Plan.

6.2 Restricted Stock.

(a) Dividends. Participants holding shares of Restricted Stock will be entitled to all ordinary cash dividends paid with respect to such Shares, unless the Administrator provides otherwise in the Award Agreement. In addition, unless the Administrator provides otherwise, if any dividends or distributions are paid in Shares, or consist of a dividend or distribution to holders of Common Stock of property other than an ordinary cash dividend, the Shares or other property will be subject to the same restrictions on transferability and forfeitability as the shares of Restricted Stock with respect to which they were paid.

(b) Stock Certificates. The Company may require that the Participant deposit in escrow with the Company (or its designee) any stock certificates issued in respect of shares of Restricted Stock, together with a stock power endorsed in blank.

6.3 Restricted Stock Units.

(a) Settlement. The Administrator may provide that settlement of Restricted Stock Units will occur upon or as soon as reasonably practicable after the Restricted Stock Units vest or will instead be deferred, on a mandatory basis or at the Participant's election, in a manner intended to comply with Section 409A.

(b) Stockholder Rights. A Participant will have no rights of a stockholder with respect to Shares subject to any Restricted Stock Unit unless and until the Shares are delivered in settlement of the Restricted Stock Unit.

(c) Dividend Equivalents. If the Administrator provides, a grant of Restricted Stock Units may provide a Participant with the right to receive Dividend Equivalents. Dividend Equivalents may be paid currently or credited to an account for the Participant, settled in cash or Shares and subject to the same restrictions on transferability and forfeitability as the Restricted Stock Units with respect to which the Dividend Equivalents are granted and subject to other terms and conditions as set forth in the Award Agreement.

ARTICLE VII.
OTHER STOCK OR CASH BASED AWARDS

Other Stock or Cash Based Awards may be granted to Participants, including Awards entitling Participants to receive Shares to be delivered in the future and including annual or other periodic or long-term cash bonus awards (whether based on specified Performance Criteria or otherwise), in each case subject to any conditions and limitations in the Plan. Such Other Stock or Cash Based Awards will also be available as a payment form in the settlement of other Awards, as standalone payments and as payment in lieu of compensation to which a Participant is otherwise entitled. Other Stock or Cash Based Awards may be paid in Shares, cash or other property, as the Administrator determines. Subject to the provisions of the Plan, the Administrator will determine the terms and conditions of each Other Stock or Cash Based Award, including any purchase price, performance goal (which may be based on the Performance Criteria), transfer restrictions, and vesting conditions, which will be set forth in the applicable Award Agreement.

ARTICLE VIII.
ADJUSTMENTS FOR CHANGES IN COMMON STOCK AND CERTAIN OTHER EVENTS

8.1 Equity Restructuring(a) . In connection with any Equity Restructuring, notwithstanding anything to the contrary in this Article VIII, the Administrator will equitably adjust each outstanding Award as it deems appropriate to reflect the Equity Restructuring, which may include adjusting the number and type of securities subject to each outstanding Award and/or the Award's exercise price or grant price (if applicable), granting new Awards to Participants, and making a cash payment to Participants. The adjustments provided under this Section 8.1 will be nondiscretionary and final and binding on the affected Participant and the Company; provided that the Administrator will determine whether an adjustment is equitable.

8.2 Corporate Transactions. In the event of any dividend or other distribution (whether in the form of cash, Common Stock, other securities, or other property), reorganization, merger, consolidation, combination, amalgamation, repurchase, recapitalization, liquidation, dissolution, or sale, transfer, exchange or other disposition of all or substantially all of the assets of the Company, or sale or exchange of Common Stock or other securities of the Company, Change in Control, issuance of warrants or other

rights to purchase Common Stock or other securities of the Company, other similar corporate transaction or event, other unusual or nonrecurring transaction or event affecting the Company or its financial statements or any change in any Applicable Laws or accounting principles, the Administrator, on such terms and conditions as it deems appropriate, either by the terms of the Award or by action taken prior to the occurrence of such transaction or event (except that action to give effect to a change in Applicable Law or accounting principles may be made within a reasonable period of time after such change) and either automatically or upon the Participant's request, is hereby authorized to take any one or more of the following actions whenever the Administrator determines that such action is appropriate in order to (x) prevent dilution or enlargement of the benefits or potential benefits intended by the Company to be made available under the Plan or with respect to any Award granted or issued under the Plan, (y) to facilitate such transaction or event or (z) give effect to such changes in Applicable Laws or accounting principles:

(a) To provide for the cancellation of any such Award in exchange for either an amount of cash or other property with a value equal to the amount that could have been obtained upon the exercise or settlement of the vested portion of such Award or realization of the Participant's rights under the vested portion of such Award, as applicable; provided that, if the amount that could have been obtained upon the exercise or settlement of the vested portion of such Award or realization of the Participant's rights, in any case, is equal to or less than zero, then the Award may be terminated without payment;

(b) To provide that such Award shall vest and, to the extent applicable, be exercisable as to all shares covered thereby, notwithstanding anything to the contrary in the Plan or the provisions of such Award;

(c) To provide that such Award be assumed by the successor or survivor corporation, or a parent or subsidiary thereof, or shall be substituted for by awards covering the stock of the successor or survivor corporation, or a parent or subsidiary thereof, with appropriate adjustments as to the number and kind of shares and/or applicable exercise or purchase price, in all cases, as determined by the Administrator;

(d) To make adjustments in the number and type of shares of Common Stock (or other securities or property) subject to outstanding Awards and/or with respect to which Awards may be granted under the Plan (including, but not limited to, adjustments of the limitations in Article IV hereof on the maximum number and kind of shares which may be issued) and/or in the terms and conditions of (including the grant or exercise price), and the criteria included in, outstanding Awards;

(e) To replace such Award with other rights or property selected by the Administrator; and/or

(f) To provide that the Award will terminate and cannot vest, be exercised or become payable after the applicable event.

8.3 Administrative Stand Still. In the event of any pending stock dividend, stock split, combination or exchange of shares, merger, consolidation or other distribution (other than normal cash dividends) of Company assets to stockholders, or any other extraordinary transaction or change affecting the Shares or the share price of Common Stock, including any Equity Restructuring or any securities offering or other similar transaction, for administrative convenience, the Administrator may refuse to permit the exercise of any Award for up to sixty days before or after such transaction.

8.4 General. Except as expressly provided in the Plan or the Administrator's action under the Plan, no Participant will have any rights due to any subdivision or consolidation of Shares of any class, dividend payment, increase or decrease in the number of Shares of any class or dissolution, liquidation, merger, or consolidation of the Company or other corporation. Except as expressly provided with respect to an Equity Restructuring under Section 8.1 above or the Administrator's action under the Plan, no issuance by the Company of Shares of any class, or securities convertible into Shares of any class, will affect, and no adjustment will be made regarding, the number of Shares subject to an Award or the Award's grant or exercise price. The existence of the Plan, any Award Agreements and the Awards granted hereunder will not affect or restrict in any way the Company's right or power to make or authorize (i) any adjustment, recapitalization, reorganization or other change in the Company's capital structure or its business, (ii) any merger, consolidation dissolution or liquidation of the Company or sale of Company assets or (iii) any sale or issuance of securities, including securities with rights superior to those of the Shares or securities convertible into or exchangeable for Shares. The Administrator may treat Participants and Awards (or portions thereof) differently under this Article VIII.

ARTICLE IX.
GENERAL PROVISIONS APPLICABLE TO AWARDS

9.1 Transferability. Except as the Administrator may determine or provide in an Award Agreement or otherwise for Awards other than Incentive Stock Options, Awards may not be sold, assigned, transferred, pledged or otherwise encumbered, either voluntarily or by operation of law, except by will or the laws of descent and distribution, or, subject to the Administrator's consent, pursuant to a domestic relations order, and, during the life of the Participant, will be exercisable only by the Participant. References to a Participant, to the extent relevant in the context, will include references to a Participant's authorized transferee that the Administrator specifically approves.

9.2 Documentation. Each Award will be evidenced in an Award Agreement, which may be written or electronic, as the Administrator determines. Each Award may contain terms and conditions in addition to those set forth in the Plan.

9.3 Discretion. Except as the Plan otherwise provides, each Award may be made alone or in addition or in relation to any other Award. The terms of each Award to a Participant need not be identical, and the Administrator need not treat Participants or Awards (or portions thereof) uniformly.

9.4 Termination of Status. The Administrator will determine how the disability, death, retirement, authorized leave of absence or any other change or purported change in a Participant's Service Provider status affects an Award and the extent to which, and the period during which, the Participant, the Participant's legal representative, conservator, guardian or Designated Beneficiary may exercise rights under the Award, if applicable.

9.5 Withholding. Each Participant must pay the Company, or make provision satisfactory to the Administrator for payment of, any taxes required by law to be withheld in connection with such Participant's Awards by the date of the event creating the tax liability. The Company may deduct an amount sufficient to satisfy such tax obligations based on the applicable statutory withholding rates (or such other rate as may be determined by the Company after considering any accounting consequences or costs) from any payment of any kind otherwise due to a Participant. Subject to Section 10.8 and any Company insider trading policy (including blackout periods), Participants may satisfy such tax obligations (i) in cash, by wire transfer of immediately available funds, by check made payable to the order of the Company, provided that the Company may limit the use of the foregoing payment forms if one or more of the payment forms below is permitted, (ii) to the extent permitted by the Administrator, in whole or in part by delivery of Shares, including Shares retained from the Award creating the tax obligation, valued at their Fair Market Value, (iii) if there is a public market for Shares at the time the tax obligations are satisfied, unless the Company otherwise determines, (A) delivery (including

telephonically to the extent permitted by the Company) of an irrevocable and unconditional undertaking by a broker acceptable to the Company to deliver promptly to the Company sufficient funds to satisfy the tax obligations, or (B) delivery by the Participant to the Company of a copy of irrevocable and unconditional instructions to a broker acceptable to the Company to deliver promptly to the Company cash or a check sufficient to satisfy the tax withholding; provided that such amount is paid to the Company at such time as may be required by the Administrator, or (iv) to the extent permitted by the Company, any combination of the foregoing payment forms approved by the Administrator. If any tax withholding obligation will be satisfied under clause (ii) of the immediately preceding sentence by the Company's retention of Shares from the Award creating the tax obligation and there is a public market for Shares at the time the tax obligation is satisfied, the Company may elect to instruct any brokerage firm determined acceptable to the Company for such purpose to sell on the applicable Participant's behalf some or all of the Shares retained and to remit the proceeds of the sale to the Company or its designee, and each Participant's acceptance of an Award under the Plan will constitute the Participant's authorization to the Company and instruction and authorization to such brokerage firm to complete the transactions described in this sentence.

9.6 Amendment of Award; Repricing. The Administrator may amend, modify or terminate any outstanding Award, including by substituting another Award of the same or a different type, changing the exercise or settlement date, and converting an Incentive Stock Option to a Non-Qualified Stock Option. The Participant's consent to such action will be required unless (i) the action, taking into account any related action, does not materially and adversely affect the Participant's rights under the Award, or (ii) the change is permitted under Article VIII or pursuant to Section 10.6. Notwithstanding the foregoing or anything in the Plan to the contrary, the Administrator may not except pursuant to Article VIII, without the approval of the stockholders of the Company, reduce the exercise price per share of outstanding Options or Stock Appreciation Rights or cancel outstanding Options or Stock Appreciation Rights in exchange for cash, other Awards or Options or Stock Appreciation Rights with an exercise price per share that is less than the exercise price per share of the original Options or Stock Appreciation Rights.

9.7 Conditions on Delivery of Stock. The Company will not be obligated to deliver any Shares under the Plan or remove restrictions from Shares previously delivered under the Plan until (i) all Award conditions have been met or removed to the Company's satisfaction, (ii) as determined by the Company, all other legal matters regarding the issuance and delivery of such Shares have been satisfied, including any applicable securities laws and stock exchange or stock market rules and regulations, and (iii) the Participant has executed and delivered to the Company such representations or agreements as the Administrator deems necessary or appropriate to satisfy any Applicable Laws. The Company's inability to obtain authority from any regulatory body having jurisdiction, which the Administrator determines is necessary to the lawful issuance and sale of any securities, will relieve the Company of any liability for failing to issue or sell such Shares as to which such requisite authority has not been obtained.

9.8 Acceleration. The Administrator may at any time provide that any Award will become immediately vested and fully or partially exercisable, free of some or all restrictions or conditions, or otherwise fully or partially realizable.

9.9 Additional Terms of Incentive Stock Options. The Administrator may grant Incentive Stock Options only to employees of the Company, any of its present or future parent or subsidiary corporations, as defined in Sections 424(e) or (f) of the Code, respectively, and any other entities the employees of which are eligible to receive Incentive Stock Options under the Code. If an Incentive Stock Option is granted to a Greater Than 10% Stockholder, the exercise price will not be less than 110% of the Fair Market Value on the Option's grant date, and the term of the Option will not exceed five years. All Incentive Stock Options will be subject to and construed consistently with Section 422 of the Code. By accepting an Incentive Stock Option, the Participant agrees to give prompt notice to the Company of

dispositions or other transfers (other than in connection with a Change in Control) of Shares acquired under the Option made within (i) two years from the grant date of the Option or (ii) one year after the transfer of such Shares to the Participant, specifying the date of the disposition or other transfer and the amount the Participant realized, in cash, other property, assumption of indebtedness or other consideration, in such disposition or other transfer. Neither the Company nor the Administrator will be liable to a Participant, or any other party, if an Incentive Stock Option fails or ceases to qualify as an "incentive stock option" under Section 422 of the Code. Any Incentive Stock Option or portion thereof that fails to qualify as an "incentive stock option" under Section 422 of the Code for any reason, including becoming exercisable with respect to Shares having a fair market value exceeding the $100,000 limitation under Treasury Regulation Section 1.422-4, will be a Non-Qualified Stock Option.

ARTICLE X.
MISCELLANEOUS

10.1 No Right to Employment or Other Status. No person will have any claim or right to be granted an Award, and the grant of an Award will not be construed as giving a Participant the right to continued employment or any other relationship with the Company. The Company expressly reserves the right at any time to dismiss or otherwise terminate its relationship with a Participant free from any liability or claim under the Plan or any Award, except as expressly provided in an Award Agreement.

10.2 No Rights as Stockholder; Certificates. Subject to the Award Agreement, no Participant or Designated Beneficiary will have any rights as a stockholder with respect to any Shares to be distributed under an Award until becoming the record holder of such Shares. Notwithstanding any other provision of the Plan, unless the Administrator otherwise determines or Applicable Laws require, the Company will not be required to deliver to any Participant certificates evidencing Shares issued in connection with any Award and instead such Shares may be recorded in the books of the Company (or, as applicable, its transfer agent or stock plan administrator). The Company may place legends on stock certificates issued under the Plan that the Administrator deems necessary or appropriate to comply with Applicable Laws.

10.3 Effective Date and Term of Plan. Unless earlier terminated by the Board, the Plan will become effective on the day prior to the Public Trading Date and will remain in effect until the tenth anniversary of the earlier of (i) the date the Board adopted the Plan or (ii) the date the Company's stockholders approved the Plan, but Awards previously granted may extend beyond that date in accordance with the Plan. If the Plan is not approved by the Company's stockholders, the Plan will not become effective, no Awards will be granted under the Plan and the Prior Plans will continue in full force and effect in accordance with their terms.

10.4 Amendment of Plan. The Administrator may amend, suspend or terminate the Plan at any time; provided that no amendment, other than an increase to the Overall Share Limit, may materially and adversely affect any Award outstanding at the time of such amendment without the affected Participant's consent. No Awards may be granted under the Plan during any suspension period or after Plan termination. Awards outstanding at the time of any Plan suspension or termination will continue to be governed by the Plan and the Award Agreement, as in effect before such suspension or termination. The Board will obtain stockholder approval of any Plan amendment to the extent necessary to comply with Applicable Laws.

10.5 Provisions for Foreign Participants. The Administrator may modify Awards granted to Participants who are foreign nationals or employed outside the United States or establish subplans or procedures under the Plan to address differences in laws, rules, regulations or customs of such foreign jurisdictions with respect to tax, securities, currency, employee benefit or other matters.

10.6 Section 409A.

(a) General. The Company intends that all Awards be structured to comply with, or be exempt from, Section 409A, such that no adverse tax consequences, interest, or penalties under Section 409A apply. Notwithstanding anything in the Plan or any Award Agreement to the contrary, the Administrator may, without a Participant's consent, amend this Plan or Awards, adopt policies and procedures, or take any other actions (including amendments, policies, procedures and retroactive actions) as are necessary or appropriate to preserve the intended tax treatment of Awards, including any such actions intended to (A) exempt this Plan or any Award from Section 409A, or (B) comply with Section 409A, including regulations, guidance, compliance programs and other interpretative authority that may be issued after an Award's grant date. The Company makes no representations or warranties as to an Award's tax treatment under Section 409A or otherwise. The Company will have no obligation under this Section 10.6 or otherwise to avoid the taxes, penalties or interest under Section 409A with respect to any Award and will have no liability to any Participant or any other person if any Award, compensation or other benefits under the Plan are determined to constitute noncompliant "nonqualified deferred compensation" subject to taxes, penalties or interest under Section 409A.

(b) Separation from Service. If an Award constitutes "nonqualified deferred compensation" under Section 409A, any payment or settlement of such Award upon a termination of a Participant's Service Provider relationship will, to the extent necessary to avoid taxes under Section 409A, be made only upon the Participant's "separation from service" (within the meaning of Section 409A), whether such "separation from service" occurs upon or after the termination of the Participant's Service Provider relationship. For purposes of this Plan or any Award Agreement relating to any such payments or benefits, references to a "termination," "termination of employment" or like terms means a "separation from service."

(c) Payments to Specified Employees. Notwithstanding any contrary provision in the Plan or any Award Agreement, any payment(s) of "nonqualified deferred compensation" required to be made under an Award to a "specified employee" (as defined under Section 409A and as the Administrator determines) due to his or her "separation from service" will, to the extent necessary to avoid taxes under Section 409A(a)(2)(B)(i) of the Code, be delayed for the six-month period immediately following such "separation from service" (or, if earlier, until the specified employee's death) and will instead be paid (as set forth in the Award Agreement) on the day immediately following such six-month period or as soon as administratively practicable thereafter (without interest). Any payments of "nonqualified deferred compensation" under such Award payable more than six months following the Participant's "separation from service" will be paid at the time or times the payments are otherwise scheduled to be made.

10.7 Limitations on Liability. Notwithstanding any other provisions of the Plan, no individual acting as a director, officer, other employee or agent of the Company or any Subsidiary will be liable to any Participant, former Participant, spouse, beneficiary, or any other person for any claim, loss, liability, or expense incurred in connection with the Plan or any Award, and such individual will not be personally liable with respect to the Plan because of any contract or other instrument executed in his or her capacity as an Administrator, director, officer, other employee or agent of the Company or any Subsidiary. The Company will indemnify and hold harmless each director, officer, other employee and agent of the Company or any Subsidiary that has been or will be granted or delegated any duty or power relating to the Plan's administration or interpretation, against any cost or expense (including attorneys' fees) or liability (including any sum paid in settlement of a claim with the Administrator's approval) arising from any act or omission concerning this Plan unless arising from such person's own fraud or bad faith.

10.8 Lock-Up Period. The Company may, at the request of any underwriter representative or otherwise, in connection with registering the offering of any Company securities under the Securities Act, prohibit Participants from, directly or indirectly, selling or otherwise transferring any Shares or other Company securities during a period of up to one hundred eighty days following the effective date of a Company registration statement filed under the Securities Act, or such longer period as determined by the underwriter.

10.9 Data Privacy. As a condition for receiving any Award, each Participant explicitly and unambiguously consents to the collection, use and transfer, in electronic or other form, of personal data as described in this section by and among the Company and its Subsidiaries and affiliates exclusively for implementing, administering and managing the Participant's participation in the Plan. The Company and its Subsidiaries and affiliates may hold certain personal information about a Participant, including the Participant's name, address and telephone number; birthdate; social security, insurance number or other identification number; salary; nationality; job title(s); any Shares held in the Company or its Subsidiaries and affiliates; and Award details, to implement, manage and administer the Plan and Awards (the "***Data***"). The Company and its Subsidiaries and affiliates may transfer the Data amongst themselves as necessary to implement, administer and manage a Participant's participation in the Plan, and the Company and its Subsidiaries and affiliates may transfer the Data to third parties assisting the Company with Plan implementation, administration and management. These recipients may be located in the Participant's country, or elsewhere, and the Participant's country may have different data privacy laws and protections than the recipients' country. By accepting an Award, each Participant authorizes such recipients to receive, possess, use, retain and transfer the Data, in electronic or other form, to implement, administer and manage the Participant's participation in the Plan, including any required Data transfer to a broker or other third party with whom the Company or the Participant may elect to deposit any Shares. The Data related to a Participant will be held only as long as necessary to implement, administer, and manage the Participant's participation in the Plan. A Participant may, at any time, view the Data that the Company holds regarding such Participant, request additional information about the storage and processing of the Data regarding such Participant, recommend any necessary corrections to the Data regarding the Participant or refuse or withdraw the consents in this Section 10.9 in writing, without cost, by contacting the local human resources representative. The Company may cancel Participant's ability to participate in the Plan and, in the Administrator's discretion, the Participant may forfeit any outstanding Awards if the Participant refuses or withdraws the consents in this Section 10.9. For more information on the consequences of refusing or withdrawing consent, Participants may contact their local human resources representative.

10.10 Severability. If any portion of the Plan or any action taken under it is held illegal or invalid for any reason, the illegality or invalidity will not affect the remaining parts of the Plan, and the Plan will be construed and enforced as if the illegal or invalid provisions had been excluded, and the illegal or invalid action will be null and void.

10.11 Governing Documents. If any contradiction occurs between the Plan and any Award Agreement or other written agreement between a Participant and the Company (or any Subsidiary) that the Administrator has approved, the Plan will govern, unless it is expressly specified in such Award Agreement or other written document that a specific provision of the Plan will not apply.

10.12 Governing Law. The Plan and all Awards will be governed by and interpreted in accordance with the laws of the State of Delaware, disregarding any state's choice-of-law principles requiring the application of a jurisdiction's laws other than the State of Delaware.

10.13 Claw-back Provisions. All Awards (including any proceeds, gains or other economic benefit the Participant actually or constructively receives upon receipt or exercise of any Award or the receipt or resale of any Shares underlying the Award) will be subject to any Company claw-back policy, including any claw-back policy adopted to comply with Applicable Laws (including the Dodd-Frank Wall Street Reform and Consumer Protection Act and any rules or regulations promulgated thereunder) as set forth in such claw-back policy or the Award Agreement.

10.14 Titles and Headings. The titles and headings in the Plan are for convenience of reference only and, if any conflict, the Plan's text, rather than such titles or headings, will control.

10.15 Conformity to Securities Laws. Participant acknowledges that the Plan is intended to conform to the extent necessary with Applicable Laws. Notwithstanding anything herein to the contrary, the Plan and all Awards will be administered only in conformance with Applicable Laws. To the extent Applicable Laws permit, the Plan and all Award Agreements will be deemed amended as necessary to conform to Applicable Laws.

10.16 Relationship to Other Benefits. No payment under the Plan will be taken into account in determining any benefits under any pension, retirement, savings, profit sharing, group insurance, welfare or other benefit plan of the Company or any Subsidiary except as expressly provided in writing in such other plan or an agreement thereunder.

10.17 Broker-Assisted Sales. In the event of a broker-assisted sale of Shares in connection with the payment of amounts owed by a Participant under or with respect to the Plan or Awards, including amounts to be paid under the final sentence of Section 9.5: (a) any Shares to be sold through the broker-assisted sale will be sold on the day the payment first becomes due, or as soon thereafter as practicable; (b) such Shares may be sold as part of a block trade with other Participants in the Plan in which all participants receive an average price; (c) the applicable Participant will be responsible for all broker's fees and other costs of sale, and by accepting an Award, each Participant agrees to indemnify and hold the Company harmless from any losses, costs, damages, or expenses relating to any such sale; (d) to the extent the Company or its designee receives proceeds of such sale that exceed the amount owed, the Company will pay such excess in cash to the applicable Participant as soon as reasonably practicable; (e) the Company and its designees are under no obligation to arrange for such sale at any particular price; and (f) in the event the proceeds of such sale are insufficient to satisfy the Participant's applicable obligation, the Participant may be required to pay immediately upon demand to the Company or its designee an amount in cash sufficient to satisfy any remaining portion of the Participant's obligation.

ARTICLE XI.
DEFINITIONS

As used in the Plan, the following words and phrases will have the following meanings:

11.1 "***Administrator***" means the Board or a Committee to the extent that the Board's powers or authority under the Plan have been delegated to such Committee.

11.2 "***Applicable Laws***" means the requirements relating to the administration of equity incentive plans under U.S. federal and state securities, tax and other applicable laws, rules and regulations, the applicable rules of any stock exchange or quotation system on which the Common Stock is listed or quoted and the applicable laws and rules of any foreign country or other jurisdiction where Awards are granted.

11.3 "***Award***" means, individually or collectively, a grant under the Plan of Options, Stock Appreciation Rights, Restricted Stock, Restricted Stock Units or Other Stock or Cash Based Awards.

11.4 "***Award Agreement***" means a written agreement evidencing an Award, which may be electronic, that contains such terms and conditions as the Administrator determines, consistent with and subject to the terms and conditions of the Plan.

11.5 "***Board***" means the Board of Directors of the Company.

11.6 "***Cause***" means (i) if a Participant is a party to a written employment or consulting agreement with the Company or any of its Subsidiaries or an Award Agreement in which the term "cause" is defined (a "***Relevant Agreement***"), "Cause" as defined in the Relevant Agreement, and (ii) if no Relevant Agreement exists, (A) the Administrator's determination that the Participant failed to substantially perform the Participant's duties (other than a failure resulting from the Participant's Disability); (B) the Administrator's determination that the Participant failed to carry out, or comply with any lawful and reasonable directive of the Board or the Participant's immediate supervisor; (C) the occurrence of any act or omission by the Participant that could reasonably be expected to result in (or has resulted in) the Participant's conviction, plea of no contest, plea of nolo contendere, or imposition of unadjudicated probation for any felony or indictable offense or crime involving moral turpitude; (D) the Participant's unlawful use (including being under the influence) or possession of illegal drugs on the premises of the Company or any of its Subsidiaries or while performing the Participant's duties and responsibilities for the Company or any of its Subsidiaries; or (E) the Participant's commission of an act of fraud, embezzlement, misappropriation, misconduct, or breach of fiduciary duty against the Company or any of its Subsidiaries.

11.7 "***Change in Control***" means and includes each of the following:

(a) A transaction or series of transactions (other than an offering of Common Stock to the general public through a registration statement filed with the Securities and Exchange Commission or a transaction or series of transactions that meets the requirements of clauses (i) and (ii) of subsection (c) below) whereby any "person" or related "group" of "persons" (as such terms are used in Sections 13(d) and 14(d)(2) of the Exchange Act) (other than the Company, any of its Subsidiaries, an employee benefit plan maintained by the Company or any of its Subsidiaries or a "person" that, prior to such transaction, directly or indirectly controls, is controlled by, or is under common control with, the Company) directly or indirectly acquires beneficial ownership (within the meaning of Rule 13d-3 under the Exchange Act) of securities of the Company possessing more than 50% of the total combined voting power of the Company's securities outstanding immediately after such acquisition; or

(b) During any period of two consecutive years, individuals who, at the beginning of such period, constitute the Board together with any new Director(s) (other than a Director designated by a person who shall have entered into an agreement with the Company to effect a transaction described in subsections (a) or (c)) whose election by the Board or nomination for election by the Company's stockholders was approved by a vote of at least two-thirds of the Directors then still in office who either were Directors at the beginning of the two-year period or whose election or nomination for election was previously so approved, cease for any reason to constitute a majority thereof; or

(c) The consummation by the Company (whether directly involving the Company or indirectly involving the Company through one or more intermediaries) of (x) a merger, consolidation, reorganization, or business combination or (y) a sale or other disposition of all or substantially all of the Company's assets in any single transaction or series of related transactions or (z) the acquisition of assets or stock of another entity, in each case other than a transaction:

(i) which results in the Company's voting securities outstanding immediately before the transaction continuing to represent (either by remaining outstanding or by being converted into voting securities of the Company or the person that, as a result of the transaction, controls, directly or indirectly, the Company or owns, directly or indirectly, all or substantially all of the Company's assets or otherwise succeeds to the business of the Company (the Company or such person, the "***Successor Entity***")) directly or indirectly, at least a majority of the combined voting power of the Successor Entity's outstanding voting securities immediately after the transaction, and

(ii) after which no person or group beneficially owns voting securities representing 50% or more of the combined voting power of the Successor Entity; provided, however, that no person or group shall be treated for purposes of this clause (ii) as beneficially owning 50% or more of the combined voting power of the Successor Entity solely as a result of the voting power held in the Company prior to the consummation of the transaction.

Notwithstanding the foregoing, if a Change in Control constitutes a payment event with respect to any Award (or portion of any Award) that provides for the deferral of compensation that is subject to Section 409A, to the extent required to avoid the imposition of additional taxes under Section 409A, the transaction or event described in subsection (a), (b) or (c) with respect to such Award (or portion thereof) shall only constitute a Change in Control for purposes of the payment timing of such Award if such transaction also constitutes a "change in control event," as defined in Treasury Regulation Section 1.409A-3(i)(5).

The Administrator shall have full and final authority, which shall be exercised in its discretion, to determine conclusively whether a Change in Control has occurred pursuant to the above definition, the date of the occurrence of such Change in Control and any incidental matters relating thereto; provided that any exercise of authority in conjunction with a determination of whether a Change in Control is a "change in control event" as defined in Treasury Regulation Section 1.409A-3(i)(5) shall be consistent with such regulation.

11.8 "***Code***" means the Internal Revenue Code of 1986, as amended, and the regulations issued thereunder.

11.9 "***Committee***" means one or more committees or subcommittees of the Board, which may include one or more Company directors or executive officers, to the extent Applicable Laws permit. To the extent required to comply with the provisions of Rule 16b-3, it is intended that each member of the Committee will be, at the time the Committee takes any action with respect to an Award that is subject to Rule 16b-3, a "non-employee director" within the meaning of Rule 16b-3; however, a Committee member's failure to qualify as a "non-employee director" within the meaning of Rule 16b-3 will not invalidate any Award granted by the Committee that is otherwise validly granted under the Plan.

11.10 "***Common Stock***" means the common stock of the Company.

11.11 "***Company***" means Precision BioSciences, Inc., a Delaware corporation, or any successor.

11.12 "***Consultant***" means any person, including any adviser, engaged by the Company or its parent or Subsidiary to render services to such entity if the consultant or adviser: (i) renders bona fide services to the Company; (ii) renders services not in connection with the offer or sale of securities in a capital-raising transaction and does not directly or indirectly promote or maintain a market for the Company's securities; and (iii) is a natural person.

11.13 "***Designated Beneficiary***" means the beneficiary or beneficiaries the Participant designates, in a manner the Administrator determines, to receive amounts due or exercise the Participant's rights if the Participant dies or becomes incapacitated. Without a Participant's effective designation, "Designated Beneficiary" will mean the Participant's estate.

11.14 "***Director***" means a Board member.

11.15 "***Disability***" means a permanent and total disability under Section 22(e)(3) of the Code, as amended.

11.16 "***Dividend Equivalents***" means a right granted to a Participant under the Plan to receive the equivalent value (in cash or Shares) of dividends paid on Shares.

11.17 "***Employee***" means any employee of the Company or its Subsidiaries.

11.18 "***Equity Restructuring***" means a nonreciprocal transaction between the Company and its stockholders, such as a stock dividend, stock split, spin-off or recapitalization through a large, nonrecurring cash dividend, that affects the number or kind of Shares (or other Company securities) or the share price of Common Stock (or other Company securities) and causes a change in the per share value of the Common Stock underlying outstanding Awards.

11.19 "***Exchange Act***" means the Securities Exchange Act of 1934, as amended.

11.20 "***Fair Market Value***" means, as of any date, the value of Common Stock determined as follows: (i) if the Common Stock is listed on any established stock exchange, its Fair Market Value will be the closing sales price for such Common Stock as quoted on such exchange for such date, or if no sale occurred on such date, the last day preceding such date during which a sale occurred, as reported in The Wall Street Journal or another source the Administrator deems reliable; (ii) if the Common Stock is not traded on a stock exchange but is quoted on a national market or other quotation system, the closing sales price on such date, or if no sales occurred on such date, then on the last date preceding such date during which a sale occurred, as reported in The Wall Street Journal or another source the Administrator deems reliable; or (iii) without an established market for the Common Stock, the Administrator will determine the Fair Market Value in its discretion. Notwithstanding the foregoing, with respect to any Award granted on the pricing date of the Company's initial public offering, the Fair Market Value shall mean the initial public offering price of a Share as set forth in the Company's final prospectus relating to its initial public offering filed with the Securities and Exchange Commission.

11.21 "***Greater Than 10% Stockholder***" means an individual then owning (within the meaning of Section 424(d) of the Code) more than 10% of the total combined voting power of all classes of stock of the Company or its parent or subsidiary corporation, as defined in Section 424(e) and (f) of the Code, respectively.

11.22 "***Incentive Stock Option***" means an Option intended to qualify as an "incentive stock option" as defined in Section 422 of the Code.

11.23 "***Non-Qualified Stock Option***" means an Option not intended or not qualifying as an Incentive Stock Option.

11.24 "***Option***" means an option to purchase Shares.

11.25 "***Other Stock or Cash Based Awards***" means cash awards, awards of Shares, and other awards valued wholly or partially by referring to, or are otherwise based on, Shares or other property.

11.26 "***Overall Share Limit***" means the sum of (i) 4,750,000 Shares; (ii) any shares of Common Stock which are subject to Prior Plan Awards which become available for issuance under the Plan pursuant to Article IV and (iii) an annual increase on the first day of each calendar year beginning January 1, 2020 and ending on and including January 1, 2029, equal to the lesser of (A) 4% of the aggregate number of shares of Common Stock outstanding on the final day of the immediately preceding calendar year and (B) such smaller number of Shares as is determined by the Board.

11.27 "***Participant***" means a Service Provider who has been granted an Award.

11.28 "***Performance Criteria***" mean the criteria (and adjustments) that the Administrator may select for an Award to establish performance goals for a performance period, which may include the following: net earnings or losses (either before or after one or more of interest, taxes, depreciation, amortization, and non-cash equity-based compensation expense); gross or net sales or revenue or sales or revenue growth; net income (either before or after taxes) or adjusted net income; profits (including but not limited to gross profits, net profits, profit growth, net operation profit or economic profit), profit return ratios or operating margin; budget or operating earnings (either before or after taxes or before or after allocation of corporate overhead and bonus); cash flow (including operating cash flow and free cash flow or cash flow return on capital); return on assets; return on capital or invested capital; cost of capital; return on stockholders' equity; total stockholder return; return on sales; costs, reductions in costs and cost control measures; expenses; working capital; earnings or loss per share; adjusted earnings or loss per share; price per share or dividends per share (or appreciation in or maintenance of such price or dividends); regulatory achievements or compliance; implementation, completion or attainment of objectives relating to research, development, regulatory, commercial, or strategic milestones or developments; market share; economic value or economic value added models; division, group or corporate financial goals; customer satisfaction/growth; customer service; employee satisfaction; recruitment and maintenance of personnel; human resources management; supervision of litigation and other legal matters; strategic partnerships and transactions; financial ratios (including those measuring liquidity, activity, profitability or leverage); debt levels or reductions; sales-related goals; financing and other capital raising transactions; cash on hand; acquisition activity; investment sourcing activity; and marketing initiatives, any of which may be measured in absolute terms or as compared to any incremental increase or decrease. Such performance goals also may be based solely by reference to the Company's performance or the performance of a Subsidiary, division, business segment or business unit of the Company or a Subsidiary, or based upon performance relative to performance of other companies or upon comparisons of any of the indicators of performance relative to performance of other companies. The Committee may provide for exclusion of the impact of an event or occurrence which the Committee determines should appropriately be excluded, including (a) restructurings, discontinued operations, extraordinary items, and other unusual, infrequently occurring or non-recurring charges or events, (b) asset write-downs, (c) litigation or claim judgments or settlements, (d) acquisitions or divestitures, (e) reorganization or change in the corporate structure or capital structure of the Company, (f) an event either not directly related to the operations of the Company, Subsidiary, division, business segment or business unit or not within the reasonable control of management, (g) foreign exchange gains and losses, (h) a change in the fiscal year of the Company, (i) the refinancing or repurchase of bank loans or debt securities, (j) unbudgeted capital expenditures, (k) the issuance or repurchase of equity securities and other changes in the number of outstanding shares, (l) conversion of some or all of convertible securities to Common Stock, (m) any business interruption event (n) the cumulative effects of tax or accounting changes in accordance with U.S. generally accepted accounting principles, or (o) the effect of changes in other laws or regulatory rules affecting reported results.

11.29 "***Plan***" means this 2019 Incentive Award Plan.

11.30 "***Prior Plans***" means, collectively, the Company's 2015 Stock Incentive Plan, 2006 Stock Incentive Plan, and any prior equity incentive plans of the Company or its predecessor.

11.31 "***Prior Plan Award***" means an award outstanding under the Prior Plans as of the Plan's effective date in Section 10.3.

11.32 "***Public Trading Date***" means the first date upon which the Common Stock is listed (or approved for listing) upon notice of issuance on any securities exchange or designated (or approved for designation) upon notice of issuance as a national market security on an interdealer quotation system, or, if earlier, the date on which the Company becomes a "publicly held corporation" for purposes of Treasury Regulation Section 1.162-27(c)(1).

11.33 "***Restricted Stock***" means Shares awarded to a Participant under Article VI subject to certain vesting conditions and other restrictions.

11.34 "***Restricted Stock Unit***" means an unfunded, unsecured right to receive, on the applicable settlement date, one Share or an amount in cash or other consideration determined by the Administrator to be of equal value as of such settlement date, subject to certain vesting conditions and other restrictions.

11.35 "***Rule 16b-3***" means Rule 16b-3 promulgated under the Exchange Act.

11.36 "***Section 409A***" means Section 409A of the Code and all regulations, guidance, compliance programs and other interpretative authority thereunder.

11.37 "***Securities Act***" means the Securities Act of 1933, as amended.

11.38 "***Service Provider***" means an Employee, Consultant or Director.

11.39 "***Shares***" means shares of Common Stock.

11.40 "***Stock Appreciation Right***" means a stock appreciation right granted under Article V.

11.41 "***Subsidiary***" means any entity (other than the Company), whether domestic or foreign, in an unbroken chain of entities beginning with the Company if each of the entities other than the last entity in the unbroken chain beneficially owns, at the time of the determination, securities or interests representing at least 50% of the total combined voting power of all classes of securities or interests in one of the other entities in such chain.

11.42 "***Substitute Awards***" shall mean Awards granted or Shares issued by the Company in assumption of, or in substitution or exchange for, awards previously granted, or the right or obligation to make future awards, in each case by a company acquired by the Company or any Subsidiary or with which the Company or any Subsidiary combines.

11.43 "***Termination of Service***" means the date the Participant ceases to be a Service Provider.

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PRECISION BIOSCIENCES, INC.
2019 EMPLOYEE STOCK PURCHASE PLAN

ARTICLE I.
PURPOSE

The purposes of this Precision BioSciences, Inc. 2019 Employee Stock Purchase Plan (as it may be amended or restated from time to time, the "***Plan***") are to assist Eligible Employees of Precision BioSciences, Inc., a Delaware corporation (the "***Company***"), and its Designated Subsidiaries in acquiring a stock ownership interest in the Company pursuant to a plan which is intended to qualify as an "employee stock purchase plan" within the meaning of Section 423(b) of the Code, and to help Eligible Employees provide for their future security and to encourage them to remain in the employment of the Company and its Designated Subsidiaries.

ARTICLE II.
DEFINITIONS AND CONSTRUCTION

Wherever the following terms are used in the Plan they shall have the meanings specified below, unless the context clearly indicates otherwise. The singular pronoun shall include the plural where the context so indicates. Masculine, feminine and neuter pronouns are used interchangeably and each comprehends the others.

2.1 "***Administrator***" shall mean the entity that conducts the general administration of the Plan as provided in Article XI. The term "Administrator" shall refer to the Committee unless the Board has assumed the authority for administration of the Plan as provided in Article XI.

2.2 "***Applicable Law***" shall mean the requirements relating to the administration of equity incentive plans under U.S. federal and state securities, tax and other applicable laws, rules and regulations, the applicable rules of any stock exchange or quotation system on which the Common Stock is listed or quoted and the applicable laws and rules of any foreign country or other jurisdiction where rights under this Plan are granted.

2.3 "***Board***" shall mean the Board of Directors of the Company.

2.4 "***Change in Control***" shall mean and include each of the following:

(a) A transaction or series of transactions (other than an offering of Common Stock to the general public through a registration statement filed with the Securities and Exchange Commission or a transaction or series of transactions that meets the requirements of clauses (i) and (ii) of subsection (c) below) whereby any "person" or related "group" of "persons" (as such terms are used in Sections 13(d) and 14(d)(2) of the Exchange Act) (other than the Company, any of its Subsidiaries, an employee benefit plan maintained by the Company or any of its Subsidiaries or a "person" that, prior to such transaction, directly or indirectly controls, is controlled by, or is under common control with, the Company) directly or indirectly acquires beneficial ownership (within the meaning of Rule 13d-3 under the Exchange Act) of securities of the Company possessing more than 50% of the total combined voting power of the Company's securities outstanding immediately after such acquisition; or

(b) During any period of two consecutive years, individuals who, at the beginning of such period, constitute the Board together with any new director(s) (other than a director designated by a person who shall have entered into an agreement with the Company to effect a transaction described in subsections (a) or (c)) whose election by the Board or nomination for election by the Company's stockholders was approved by a vote of at least two-thirds of the directors then still in office who either were directors at the beginning of the two-year period or whose election or nomination for election was previously so approved, cease for any reason to constitute a majority thereof; or

(c) The consummation by the Company (whether directly involving the Company or indirectly involving the Company through one or more intermediaries) of (x) a merger, consolidation, reorganization, or business combination or (y) a sale or other disposition of all or substantially all of the Company's assets in any single transaction or series of related transactions or (z) the acquisition of assets or stock of another entity, in each case other than a transaction:

(i) which results in the Company's voting securities outstanding immediately before the transaction continuing to represent (either by remaining outstanding or by being converted into voting securities of the Company or the person that, as a result of the transaction, controls, directly or indirectly, the Company or owns, directly or indirectly, all or substantially all of the Company's assets or otherwise succeeds to the business of the Company (the Company or such person, the "***Successor Entity***")) directly or indirectly, at least a majority of the combined voting power of the Successor Entity's outstanding voting securities immediately after the transaction, and

(ii) after which no person or group beneficially owns voting securities representing 50% or more of the combined voting power of the Successor Entity; provided, however, that no person or group shall be treated for purposes of this clause (ii) as beneficially owning 50% or more of the combined voting power of the Successor Entity solely as a result of the voting power held in the Company prior to the consummation of the transaction.

The Administrator shall have full and final authority, which shall be exercised in its discretion, to determine conclusively whether a Change in Control has occurred pursuant to the above definition, the date of the occurrence of such Change in Control and any incidental matters relating thereto.

2.5 "***Code***" shall mean the Internal Revenue Code of 1986, as amended, and the regulations issued thereunder.

2.6 "***Common Stock***" shall mean the common stock of the Company.

2.7 "***Company***" shall mean Precision BioSciences, Inc., a Delaware corporation, or any successor.

2.8 "***Compensation***" of an Eligible Employee shall mean the gross base compensation received by such Eligible Employee as compensation for services to the Company or any Designated Subsidiary, including overtime payments and excluding sales commissions, incentive compensation, bonuses, expense reimbursements, fringe benefits and other special payments.

2.9 "***Designated Subsidiary***" shall mean any Subsidiary designated by the Administrator in accordance with Section 11.3(b).

2.10 "***Effective Date***" shall mean the day prior to the Public Trading Date.

2.11 "***Eligible Employee***" shall mean an Employee: (a) who does not, immediately after any rights under this Plan are granted, own (directly or through attribution) stock possessing 5% or more of the total combined voting power or value of all classes of Common Stock and other stock of the Company, a Parent or a Subsidiary (as determined under Section 423(b)(3) of the Code); (b) whose

customary employment is for more than twenty hours per week; and (c) whose customary employment is for more than five months in any calendar year. For purposes of the foregoing, the rules of Section 424(d) of the Code with regard to the attribution of stock ownership shall apply in determining the stock ownership of an individual, and stock that an Employee may purchase under outstanding options shall be treated as stock owned by the Employee; provided, however, that the Administrator may provide in an Offering Document that an Employee shall not be eligible to participate in an Offering Period if: (i) such Employee is a highly compensated employee within the meaning of Section 423(b)(4)(D) of the Code; and/or (ii) such Employee has not met a service requirement designated by the Administrator pursuant to Section 423(b)(4)(A) of the Code (which service requirement may not exceed two years), and/or (iii) such Employee is a citizen or resident of a foreign jurisdiction and the grant of a right to purchase Common Stock under the Plan to such Employee would be prohibited under the laws of such foreign jurisdiction or the grant of a right to purchase Common Stock under the Plan to such Employee in compliance with the laws of such foreign jurisdiction would cause the Plan to violate the requirements of Section 423 of the Code, as determined by the Administrator in its sole discretion; provided, further, that any exclusion in clauses (i), (ii) or (iii) shall be applied in an identical manner under each Offering Period to all Employees, in accordance with Treasury Regulation Section 1.423-2(e).

2.12 "***Employee***" shall mean any officer or other employee (as defined in accordance with Section 3401(c) of the Code) of the Company or any Designated Subsidiary. "Employee" shall not include any director of the Company or a Designated Subsidiary who does not render services to the Company or a Designated Subsidiary as an employee within the meaning of Section 3401(c) of the Code. For purposes of the Plan, the employment relationship shall be treated as continuing intact while the individual is on sick leave or other leave of absence approved by the Company or Designated Subsidiary and meeting the requirements of Treasury Regulation Section 1.421-1(h)(2). Where the period of leave exceeds three (3) months and the individual's right to reemployment is not guaranteed either by statute or by contract, the employment relationship shall be deemed to have terminated on the first day immediately following such three (3)-month period.

2.13 "***Enrollment Date***" shall mean the first Trading Day of each Offering Period.

2.14 "***Exchange Act***" shall mean the Securities Exchange Act of 1934, as amended.

2.15 "***Fair Market Value***" means, as of any date, the value of Common Stock determined as follows: (i) if the Common Stock is listed on any established stock exchange, its Fair Market Value will be the closing sales price for such Common Stock as quoted on such exchange for such date, or if no sale occurred on such date, the last day preceding such date during which a sale occurred, as reported in The Wall Street Journal or another source the Administrator deems reliable; (ii) if the Common Stock is not traded on a stock exchange but is quoted on a national market or other quotation system, the closing sales price on such date, or if no sales occurred on such date, then on the last date preceding such date during which a sale occurred, as reported in The Wall Street Journal or another source the Administrator deems reliable; or (iii) without an established market for the Common Stock, the Administrator will determine the Fair Market Value in its discretion.

2.16 "***Offering Document***" shall have the meaning given to such term in Section 4.1.

2.17 "***Offering Period***" shall have the meaning given to such term in Section 4.1.

2.18 "***Parent***" shall mean any corporation, other than the Company, in an unbroken chain of corporations ending with the Company if, at the time of the determination, each of the corporations other than the Company owns stock possessing 50% or more of the total combined voting power of all classes of stock in one of the other corporations in such chain.

2.19 "***Participant***" shall mean any Eligible Employee who has executed a subscription agreement and been granted rights to purchase Common Stock pursuant to the Plan.

2.20 "***Plan***" shall mean this 2019 Employee Stock Purchase Plan.

2.21 "***Public Trading Date***" shall mean the first date upon which the Common Stock is listed (or approved for listing) upon notice of issuance on any securities exchange or designated (or approved for designation) upon notice of issuance as a national market security on an interdealer quotation system, or, if earlier, the date on which the Company becomes a "publicly held corporation" for purposes of Treasury Regulation Section 1.162-27(c)(1).

2.22 "***Purchase Date***" shall mean the last Trading Day of each Offering Period.

2.23 "***Purchase Price***" shall mean the purchase price designated by the Administrator in the applicable Offering Document (which purchase price shall not be less than 85% of the Fair Market Value of a Share on the Enrollment Date or on the Purchase Date, whichever is lower); provided, however, that, in the event no purchase price is designated by the Administrator in the applicable Offering Document, the purchase price for the Offering Periods covered by such Offering Document shall be 85% of the Fair Market Value of a Share on the Enrollment Date or on the Purchase Date, whichever is lower; provided, further, that the Purchase Price may be adjusted by the Administrator pursuant to Article VIII and shall not be less than the par value of a Share.

2.24 "***Securities Act***" shall mean the Securities Act of 1933, as amended.

2.25 "***Share***" shall mean a share of Common Stock.

2.26 "***Subsidiary***" shall mean any corporation, other than the Company, in an unbroken chain of corporations beginning with the Company if, at the time of the determination, each of the corporations other than the last corporation in an unbroken chain owns stock possessing 50% or more of the total combined voting power of all classes of stock in one of the other corporations in such chain; provided, however, that a limited liability company or partnership may be treated as a Subsidiary to the extent either (a) such entity is treated as a disregarded entity under Treasury Regulation Section 301.7701-3(a) by reason of the Company or any other Subsidiary that is a corporation being the sole owner of such entity, or (b) such entity elects to be classified as a corporation under Treasury Regulation Section 301.7701-3(a) and such entity would otherwise qualify as a Subsidiary.

2.27 "***Trading Day***" shall mean a day on which national stock exchanges in the United States are open for trading.

ARTICLE III.
SHARES SUBJECT TO THE PLAN

3.1 Number of Shares. Subject to Article VIII, the aggregate number of Shares that may be issued pursuant to rights granted under the Plan shall be 525,000 Shares. In addition to the foregoing, subject to Article VIII, on the first day of each calendar year beginning on January 1, 2020 and ending on and including January 1, 2029, the number of Shares available for issuance under the Plan shall be increased by that number of Shares equal to the lesser of (a) 1% of the Shares outstanding on the final day of the immediately preceding calendar year and (b) such smaller number of Shares as determined by the Board. If any right granted under the Plan shall for any reason terminate without having been exercised, the Common Stock not purchased under such right shall again become available for issuance under the Plan. Notwithstanding anything in this Section 3.1 to the contrary, the number of Shares that may be issued or transferred pursuant to the rights granted under the Plan shall not exceed an aggregate of 5,250,000 Shares, subject to Article VIII.

3.2 Stock Distributed. Any Common Stock distributed pursuant to the Plan may consist, in whole or in part, of authorized and unissued Common Stock, treasury stock or Common Stock purchased on the open market.

ARTICLE IV.
OFFERING PERIODS; OFFERING DOCUMENTS; PURCHASE DATES

4.1 Offering Periods. The Administrator may from time to time grant or provide for the grant of rights to purchase Common Stock under the Plan to Eligible Employees during one or more periods (each, an "***Offering Period***") selected by the Administrator. The terms and conditions applicable to each Offering Period shall be set forth in an "***Offering Document***" adopted by the Administrator, which Offering Document shall be in such form and shall contain such terms and conditions as the Administrator shall deem appropriate and shall be incorporated by reference into and made part of the Plan and shall be attached hereto as part of the Plan. The provisions of separate Offering Periods under the Plan need not be identical.

4.2 Offering Documents. Each Offering Document with respect to an Offering Period shall specify (through incorporation of the provisions of this Plan by reference or otherwise):

(a) the length of the Offering Period, which period shall not exceed twenty-seven months;

(b) the maximum number of Shares that may be purchased by any Eligible Employee during such Offering Period, which, in the absence of a contrary designation by the Administrator, shall be 25,000 Shares; and

(c) such other provisions as the Administrator determines are appropriate, subject to the Plan.

ARTICLE V.
ELIGIBILITY AND PARTICIPATION

5.1 Eligibility. Any Eligible Employee who shall be employed by the Company or a Designated Subsidiary on a given Enrollment Date for an Offering Period shall be eligible to participate in the Plan during such Offering Period, subject to the requirements of this Article V and the limitations imposed by Section 423(b) of the Code.

5.2 Enrollment in Plan.

(a) Except as otherwise set forth in an Offering Document or determined by the Administrator, an Eligible Employee may become a Participant in the Plan for an Offering Period by delivering a subscription agreement to the Company by such time prior to the Enrollment Date for such Offering Period (or such other date specified in the Offering Document) designated by the Administrator and in such form as the Company provides.

(b) Each subscription agreement shall designate a whole percentage of such Eligible Employee's Compensation to be withheld by the Company or the Designated Subsidiary employing such Eligible Employee on each payday during the Offering Period as payroll deductions under the Plan. The percentage of Compensation designated by an Eligible Employee may not be less than 1% and may not be more than the maximum percentage specified by the Administrator in the applicable Offering Document (which percentage shall be 25% in the absence of any such designation) as payroll deductions. The payroll deductions made for each Participant shall be credited to an account for such Participant under the Plan and shall be deposited with the general funds of the Company.

(c) A Participant may increase or decrease the percentage of Compensation designated in his or her subscription agreement, subject to the limits of this Section 5.2, or may suspend his or her payroll deductions, at any time during an Offering Period; provided, however, that the Administrator may limit the number of changes a Participant may make to his or her payroll deduction elections during each Offering Period in the applicable Offering Document (and in the absence of any specific designation by the Administrator, a Participant shall be allowed one change to his or her payroll deduction elections during each Offering Period). Any such change or suspension of payroll deductions shall be effective with the first full payroll period following five business days after the Company's receipt of the new subscription agreement (or such shorter or longer period as may be specified by the Administrator in the applicable Offering Document). In the event a Participant suspends his or her payroll deductions, such Participant's cumulative payroll deductions prior to the suspension shall remain in his or her account and shall be applied to the purchase of Shares on the next occurring Purchase Date and shall not be paid to such Participant unless he or she withdraws from participation in the Plan pursuant to Article VII.

(d) Except as otherwise set forth in an Offering Document or determined by the Administrator, a Participant may participate in the Plan only by means of payroll deduction and may not make contributions by lump sum payment for any Offering Period.

5.3 Payroll Deductions. Except as otherwise provided in the applicable Offering Document, payroll deductions for a Participant shall commence on the first payroll following the Enrollment Date and shall end on the last payroll in the Offering Period to which the Participant's authorization is applicable, unless sooner terminated by the Participant as provided in Article VII or suspended by the Participant or the Administrator as provided in Section 5.2 and Section 5.6, respectively.

5.4 Effect of Enrollment. A Participant's completion of a subscription agreement will enroll such Participant in the Plan for each subsequent Offering Period on the terms contained therein until the Participant either submits a new subscription agreement, withdraws from participation under the Plan as provided in Article VII or otherwise becomes ineligible to participate in the Plan.

5.5 Limitation on Purchase of Common Stock. An Eligible Employee may be granted rights under the Plan only if such rights, together with any other rights granted to such Eligible Employee under "employee stock purchase plans" of the Company, any Parent or any Subsidiary, as specified by Section 423(b)(8) of the Code, do not permit such employee's rights to purchase stock of the Company or any Parent or Subsidiary to accrue at a rate that exceeds $25,000 of the fair market value of such stock (determined as of the first day of the Offering Period during which such rights are granted) for each calendar year in which such rights are outstanding at any time. This limitation shall be applied in accordance with Section 423(b)(8) of the Code.

5.6 Decrease or Suspension of Payroll Deductions. Notwithstanding the foregoing, to the extent necessary to comply with Section 423(b)(8) of the Code and Section 5.5 or the other limitations set forth in this Plan, a Participant's payroll deductions may be suspended by the Administrator at any time during an Offering Period. The balance of the amount credited to the account of each Participant that has not been applied to the purchase of Shares by reason of Section 423(b)(8) of the Code, Section 5.5 or the other limitations set forth in this Plan shall be paid to such Participant in one lump sum in cash as soon as reasonably practicable after the Purchase Date.

5.7 Foreign Employees. In order to facilitate participation in the Plan, the Administrator may provide for such special terms applicable to Participants who are citizens or residents of a foreign jurisdiction, or who are employed by a Designated Subsidiary outside of the United States, as the Administrator may consider necessary or appropriate to accommodate differences in local law, tax policy or custom. Such special terms may not be more favorable than the terms of rights granted under the Plan to Eligible Employees who are residents of the United States. Moreover, the Administrator may approve such supplements to, or amendments, restatements or alternative versions of, this Plan as it may consider necessary or appropriate for such purposes without thereby affecting the terms of this Plan as in effect for any other purpose. No such special terms, supplements, amendments or restatements shall include any provisions that are inconsistent with the terms of this Plan as then in effect unless this Plan could have been amended to eliminate such inconsistency without further approval by the stockholders of the Company.

5.8 Leave of Absence. During leaves of absence approved by the Company meeting the requirements of Treasury Regulation Section 1.421-1(h)(2) under the Code, a Participant may continue participation in the Plan by making cash payments to the Company on his or her normal payday equal to his or her authorized payroll deduction.

ARTICLE VI.
GRANT AND EXERCISE OF RIGHTS

6.1 Grant of Rights. On the Enrollment Date of each Offering Period, each Eligible Employee participating in such Offering Period shall be granted a right to purchase the maximum number of Shares specified under Section 4.2, subject to the limits in Section 5.5, and shall have the right to buy, on each Purchase Date during such Offering Period (at the applicable Purchase Price), such number of whole Shares as is determined by dividing (a) such Participant's payroll deductions accumulated prior to such Purchase Date and retained in the Participant's account as of the Purchase Date, by (b) the applicable Purchase Price (rounded down to the nearest Share). The right shall expire on the last day of the Offering Period.

6.2 Exercise of Rights. On each Purchase Date, each Participant's accumulated payroll deductions and any other additional payments specifically provided for in the applicable Offering Document will be applied to the purchase of whole Shares, up to the maximum number of Shares permitted pursuant to the terms of the Plan and the applicable Offering Document, at the Purchase Price. No fractional Shares shall be issued upon the exercise of rights granted under the Plan, unless the Offering Document specifically provides otherwise. Any cash in lieu of fractional Shares remaining after the purchase of whole Shares upon exercise of a purchase right will be credited to a Participant's account and carried forward and applied toward the purchase of whole Shares for the next following Offering Period. Shares issued pursuant to the Plan may be evidenced in such manner as the Administrator may determine and may be issued in certificated form or issued pursuant to book-entry procedures.

6.3 Pro Rata Allocation of Shares. If the Administrator determines that, on a given Purchase Date, the number of Shares with respect to which rights are to be exercised may exceed (a) the number of Shares that were available for issuance under the Plan on the Enrollment Date of the applicable Offering Period, or (b) the number of Shares available for issuance under the Plan on such Purchase Date, the Administrator may in its sole discretion provide that the Company shall make a pro rata allocation of the Shares available for purchase on such Enrollment Date or Purchase Date, as applicable, in as uniform a manner as shall be practicable and as it shall determine in its sole discretion to be equitable among all

Participants for whom rights to purchase Common Stock are to be exercised pursuant to this Article VI on such Purchase Date, and shall either (i) continue all Offering Periods then in effect, or (ii) terminate any or all Offering Periods then in effect pursuant to Article IX. The Company may make pro rata allocation of the Shares available on the Enrollment Date of any applicable Offering Period pursuant to the preceding sentence, notwithstanding any authorization of additional Shares for issuance under the Plan by the Company's stockholders subsequent to such Enrollment Date. The balance of the amount credited to the account of each Participant that has not been applied to the purchase of Shares shall be paid to such Participant in one lump sum in cash as soon as reasonably practicable after the Purchase Date.

6.4 Withholding. At the time a Participant's rights under the Plan are exercised, in whole or in part, or at the time some or all of the Common Stock issued under the Plan is disposed of, the Participant must make adequate provision for the Company's federal, state, or other tax withholding obligations, if any, that arise upon the exercise of the right or the disposition of the Common Stock. At any time, the Company may, but shall not be obligated to, withhold from the Participant's compensation the amount necessary for the Company to meet applicable withholding obligations, including any withholding required to make available to the Company any tax deductions or benefits attributable to sale or early disposition of Common Stock by the Participant.

6.5 Conditions to Issuance of Common Stock. The Company shall not be required to issue or deliver any certificate or certificates for, or make any book entries evidencing, Shares purchased upon the exercise of rights under the Plan prior to fulfillment of all of the following conditions:

(a) The admission of such Shares to listing on all stock exchanges, if any, on which the Common Stock is then listed;

(b) The completion of any registration or other qualification of such Shares under any state or federal law or under the rulings or regulations of the Securities and Exchange Commission or any other governmental regulatory body, that the Administrator shall, in its absolute discretion, deem necessary or advisable;

(c) The obtaining of any approval or other clearance from any state or federal governmental agency that the Administrator shall, in its absolute discretion, determine to be necessary or advisable;

(d) The payment to the Company of all amounts that it is required to withhold under federal, state or local law upon exercise of the rights, if any; and

(e) The lapse of such reasonable period of time following the exercise of the rights as the Administrator may from time to time establish for reasons of administrative convenience.

ARTICLE VII.
WITHDRAWAL; CESSATION OF ELIGIBILITY

7.1 Withdrawal. A Participant may withdraw all but not less than all of the payroll deductions credited to his or her account and not yet used to exercise his or her rights under the Plan at any time by giving written notice to the Company in a form acceptable to the Company no later than one week prior to the end of the Offering Period. All of the Participant's payroll deductions credited to his or her account during an Offering Period shall be paid to such Participant as soon as reasonably practicable after receipt of notice of withdrawal and such Participant's rights for the Offering Period shall be automatically terminated, and no further payroll deductions for the purchase of Shares shall be made for such Offering Period. If a Participant withdraws from an Offering Period, payroll deductions shall not resume at the beginning of the next Offering Period unless the Participant timely delivers to the Company a new subscription agreement.

7.2 Future Participation. A Participant's withdrawal from an Offering Period shall not have any effect upon his or her eligibility to participate in any similar plan that may hereafter be adopted by the Company or a Designated Subsidiary or in subsequent Offering Periods that commence after the termination of the Offering Period from which the Participant withdraws.

7.3 Cessation of Eligibility. Upon a Participant's ceasing to be an Eligible Employee for any reason, he or she shall be deemed to have elected to withdraw from the Plan pursuant to this Article VII and the payroll deductions credited to such Participant's account during the Offering Period shall be paid to such Participant or, in the case of his or her death, to the person or persons entitled thereto under Section 12.4, as soon as reasonably practicable, and such Participant's rights for the Offering Period shall be automatically terminated.

ARTICLE VIII.
ADJUSTMENTS UPON CHANGES IN STOCK

8.1 Changes in Capitalization. Subject to Section 8.3, in the event that the Administrator determines that any dividend or other distribution (whether in the form of cash, Common Stock, other securities, or other property), Change in Control, reorganization, merger, amalgamation, consolidation, combination, repurchase, recapitalization, liquidation, dissolution, or sale, transfer, exchange or other disposition of all or substantially all of the assets of the Company, or sale or exchange of Common Stock or other securities of the Company, issuance of warrants or other rights to purchase Common Stock or other securities of the Company, or other similar corporate transaction or event, as determined by the Administrator, affects the Common Stock such that an adjustment is determined by the Administrator to be appropriate in order to prevent dilution or enlargement of the benefits or potential benefits intended by the Company to be made available under the Plan or with respect to any outstanding purchase rights under the Plan, the Administrator shall make equitable adjustments, if any, to reflect such change with respect to (a) the aggregate number and type of Shares (or other securities or property) that may be issued under the Plan (including, but not limited to, adjustments of the limitations in Section 3.1 and the limitations established in each Offering Document pursuant to Section 4.2 on the maximum number of Shares that may be purchased); (b) the class(es) and number of Shares and price per Share subject to outstanding rights; and (c) the Purchase Price with respect to any outstanding rights.

8.2 Other Adjustments. Subject to Section 8.3, in the event of any transaction or event described in Section 8.1 or any unusual or nonrecurring transactions or events affecting the Company, any affiliate of the Company, or the financial statements of the Company or any affiliate (including without limitation any Change in Control), or of changes in Applicable Law or accounting principles, the Administrator, in its discretion, and on such terms and conditions as it deems appropriate, is hereby authorized to take any one or more of the following actions whenever the Administrator determines that such action is appropriate in order to prevent the dilution or enlargement of the benefits or potential benefits intended to be made available under the Plan or with respect to any right under the Plan, to facilitate such transactions or events or to give effect to such changes in laws, regulations or principles:

(a) To provide for either (i) termination of any outstanding right in exchange for an amount of cash, if any, equal to the amount that would have been obtained upon the exercise of such right had such right been currently exercisable or (ii) the replacement of such outstanding right with other rights or property selected by the Administrator in its sole discretion;

(b) To provide that the outstanding rights under the Plan shall be assumed by the successor or survivor corporation, or a parent or subsidiary thereof, or shall be substituted for by similar rights covering the stock of the successor or survivor corporation, or a parent or subsidiary thereof, with appropriate adjustments as to the number and kind of shares and prices;

(c) To make adjustments in the number and type of Shares (or other securities or property) subject to outstanding rights under the Plan and/or in the terms and conditions of outstanding rights and rights that may be granted in the future;

(d) To provide that Participants' accumulated payroll deductions may be used to purchase Common Stock prior to the next occurring Purchase Date on such date as the Administrator determines in its sole discretion and the Participants' rights under the ongoing Offering Period(s) shall be terminated; and

(e) To provide that all outstanding rights shall terminate without being exercised.

8.3 No Adjustment Under Certain Circumstances. No adjustment or action described in this Article VIII or in any other provision of the Plan shall be authorized to the extent that such adjustment or action would cause the Plan to fail to satisfy the requirements of Section 423 of the Code.

8.4 No Other Rights. Except as expressly provided in the Plan, no Participant shall have any rights by reason of any subdivision or consolidation of shares of stock of any class, the payment of any dividend, any increase or decrease in the number of shares of stock of any class or any dissolution, liquidation, merger, or consolidation of the Company or any other corporation. Except as expressly provided in the Plan or pursuant to action of the Administrator under the Plan, no issuance by the Company of shares of stock of any class, or securities convertible into shares of stock of any class, shall affect, and no adjustment by reason thereof shall be made with respect to, the number of Shares subject to outstanding rights under the Plan or the Purchase Price with respect to any outstanding rights.

ARTICLE IX.
AMENDMENT, MODIFICATION AND TERMINATION

9.1 Amendment, Modification and Termination. The Administrator may amend, suspend or terminate the Plan at any time and from time to time; provided, however, that approval of the Company's stockholders shall be required to amend the Plan to: (a) increase the aggregate number, or change the type, of shares that may be sold pursuant to rights under the Plan under Section 3.1 (other than an adjustment as provided by Article VIII); (b) change the corporations or classes of corporations whose employees may be granted rights under the Plan; or (c) change the Plan in any manner that would cause the Plan to no longer be an "employee stock purchase plan" within the meaning of Section 423(b) of the Code.

9.2 Certain Changes to Plan. Without stockholder consent and without regard to whether any Participant rights may be considered to have been adversely affected, to the extent permitted by Section 423 of the Code, the Administrator shall be entitled to change the Offering Periods, limit the frequency and/or number of changes in the amount withheld from Compensation during an Offering Period, establish the exchange ratio applicable to amounts withheld in a currency other than U.S. dollars, permit payroll withholding in excess of the amount designated by a Participant in order to adjust for delays or mistakes in the Company's processing of withholding elections, establish reasonable waiting and adjustment periods and/or accounting and crediting procedures to ensure that amounts applied toward the purchase of Common Stock for each Participant properly correspond with amounts withheld from the Participant's Compensation, and establish such other limitations or procedures as the Administrator determines in its sole discretion to be advisable that are consistent with the Plan.

9.3 Actions In the Event of Unfavorable Financial Accounting Consequences. In the event the Administrator determines that the ongoing operation of the Plan may result in unfavorable financial accounting consequences, the Administrator may, in its discretion and, to the extent necessary or desirable, modify or amend the Plan to reduce or eliminate such accounting consequence including, but not limited to:

(a) altering the Purchase Price for any Offering Period including an Offering Period underway at the time of the change in Purchase Price;

(b) shortening any Offering Period so that the Offering Period ends on a new Purchase Date, including an Offering Period underway at the time of the Administrator action; and

(c) allocating Shares.

Such modifications or amendments shall not require stockholder approval or the consent of any Participant.

9.4 Payments Upon Termination of Plan. Upon termination of the Plan, the balance in each Participant's Plan account shall be refunded as soon as practicable after such termination, without any interest thereon.

ARTICLE X.
TERM OF PLAN

The Plan shall be effective on the Effective Date. The effectiveness of the Plan shall be subject to approval of the Plan by the stockholders of the Company within twelve months following the date the Plan is first approved by the Board. No right may be granted under the Plan prior to such stockholder approval. No rights may be granted under the Plan during any period of suspension of the Plan or after termination of the Plan.

ARTICLE XI.
ADMINISTRATION

11.1 Administrator. Unless otherwise determined by the Board, the Administrator of the Plan shall be the Compensation Committee of the Board (or another committee or a subcommittee of the Board to which the Board delegates administration of the Plan) (such committee, the "***Committee***"). The Board may at any time vest in the Board any authority or duties for administration of the Plan.

11.2 Action by the Administrator. Unless otherwise established by the Board or in any charter of the Administrator, a majority of the Administrator shall constitute a quorum. The acts of a majority of the members present at any meeting at which a quorum is present and, subject to Applicable Law and the Bylaws of the Company, acts approved in writing by a majority of the Administrator in lieu of a meeting, shall be deemed the acts of the Administrator. Each member of the Administrator is entitled to, in good faith, rely or act upon any report or other information furnished to that member by any officer or other employee of the Company or any Designated Subsidiary, the Company's independent certified public accountants, or any executive compensation consultant or other professional retained by the Company to assist in the administration of the Plan.

11.3 Authority of Administrator. The Administrator shall have the power, subject to, and within the limitations of, the express provisions of the Plan:

(a) To determine when and how rights to purchase Common Stock shall be granted and the provisions of each offering of such rights (which need not be identical).

(b) To designate from time to time which Subsidiaries of the Company shall be Designated Subsidiaries, which designation may be made without the approval of the stockholders of the Company.

(c) To construe and interpret the Plan and rights granted under it, and to establish, amend and revoke rules and regulations for its administration. The Administrator, in the exercise of this power, may correct any defect, omission or inconsistency in the Plan, in a manner and to the extent it shall deem necessary or expedient to make the Plan fully effective.

(d) To amend, suspend or terminate the Plan as provided in Article IX.

(e) Generally, to exercise such powers and to perform such acts as the Administrator deems necessary or expedient to promote the best interests of the Company and its Subsidiaries and to carry out the intent that the Plan be treated as an "employee stock purchase plan" within the meaning of Section 423 of the Code.

11.4 Decisions Binding. The Administrator's interpretation of the Plan, any rights granted pursuant to the Plan, any subscription agreement and all decisions and determinations by the Administrator with respect to the Plan are final, binding, and conclusive on all parties.

ARTICLE XII.
MISCELLANEOUS

12.1 Restriction upon Assignment. A right granted under the Plan shall not be transferable other than by will or the applicable laws of descent and distribution, and is exercisable during the Participant's lifetime only by the Participant. Except as provided in Section 12.4 hereof, a right under the Plan may not be exercised to any extent except by the Participant. The Company shall not recognize and shall be under no duty to recognize any assignment or alienation of the Participant's interest in the Plan, the Participant's rights under the Plan or any rights thereunder.

12.2 Rights as a Stockholder. With respect to Shares subject to a right granted under the Plan, a Participant shall not be deemed to be a stockholder of the Company, and the Participant shall not have any of the rights or privileges of a stockholder, until such Shares have been issued to the Participant or his or her nominee following exercise of the Participant's rights under the Plan. No adjustments shall be made for dividends (ordinary or extraordinary, whether in cash securities, or other property) or distribution or other rights for which the record date occurs prior to the date of such issuance, except as otherwise expressly provided herein or as determined by the Administrator.

12.3 Interest. No interest shall accrue on the payroll deductions or contributions of a Participant under the Plan.

12.4 Designation of Beneficiary.

(a) A Participant may, in the manner determined by the Administrator, file a written designation of a beneficiary who is to receive any Shares and/or cash, if any, from the Participant's account under the Plan in the event of such Participant's death subsequent to a Purchase Date on which the Participant's rights are exercised but prior to delivery to such Participant of such Shares and cash. In addition, a Participant may file a written designation of a beneficiary who is to receive any cash from the Participant's account under the Plan in the event of such Participant's death prior to exercise of the Participant's rights under the Plan. If the Participant is married and resides in a community property state, a designation of a person other than the Participant's spouse as his or her beneficiary shall not be effective without the prior written consent of the Participant's spouse.

(b) Such designation of beneficiary may be changed by the Participant at any time by written notice to the Company. In the event of the death of a Participant and in the absence of a beneficiary validly designated under the Plan who is living at the time of such Participant's death, the Company shall deliver such Shares and/or cash to the executor or administrator of the estate of the Participant, or if no such executor or administrator has been appointed (to the knowledge of the Company), the Company, in its discretion, may deliver such Shares and/or cash to the spouse or to any one or more dependents or relatives of the Participant, or if no spouse, dependent or relative is known to the Company, then to such other person as the Company may designate.

12.5 Notices. All notices or other communications by a Participant to the Company under or in connection with the Plan shall be deemed to have been duly given when received in the form specified by the Company at the location, or by the person, designated by the Company for the receipt thereof.

12.6 Equal Rights and Privileges. Subject to Section 5.7, all Eligible Employees will have equal rights and privileges under this Plan so that this Plan qualifies as an "employee stock purchase plan" within the meaning of Section 423 of the Code. Subject to Section 5.7, any provision of this Plan that is inconsistent with Section 423 of the Code will, without further act or amendment by the Company, the Board or the Administrator, be reformed to comply with the equal rights and privileges requirement of Section 423 of the Code.

12.7 Use of Funds. All payroll deductions received or held by the Company under the Plan may be used by the Company for any corporate purpose, and the Company shall not be obligated to segregate such payroll deductions.

12.8 Reports. Statements of account shall be given to Participants at least annually, which statements shall set forth the amounts of payroll deductions, the Purchase Price, the number of Shares purchased and the remaining cash balance, if any.

12.9 No Employment Rights. Nothing in the Plan shall be construed to give any person (including any Eligible Employee or Participant) the right to remain in the employ of the Company or any Parent or Subsidiary or affect the right of the Company or any Parent or Subsidiary to terminate the employment of any person (including any Eligible Employee or Participant) at any time, with or without cause.

12.10 Notice of Disposition of Shares. Each Participant shall give prompt notice to the Company of any disposition or other transfer of any Shares purchased upon exercise of a right under the Plan if such disposition or transfer is made: (a) within two years from the Enrollment Date of the Offering Period in which the Shares were purchased or (b) within one year after the Purchase Date on which such Shares were purchased. Such notice shall specify the date of such disposition or other transfer and the amount realized, in cash, other property, assumption of indebtedness or other consideration, by the Participant in such disposition or other transfer.

12.11 Governing Law. The Plan and any agreements hereunder shall be administered, interpreted and enforced under the internal laws of the State of Delaware without regard to conflicts of laws thereof or of any other jurisdiction.

12.12 Electronic Forms. To the extent permitted by Applicable Law and in the discretion of the Administrator, an Eligible Employee may submit any form or notice as set forth herein by means of an electronic form approved by the Administrator. Before the commencement of an Offering Period, the Administrator shall prescribe the time limits within which any such electronic form shall be submitted to the Administrator with respect to such Offering Period in order to be a valid election.

* * * * *

Exhibit 10.12

AMENDED AND RESTATED
EXECUTIVE EMPLOYMENT AGREEMENT

This Amended and Restated Executive Employment Agreement (the "Agreement") is made and entered into as of this 27th day of February, 2019 (the "Effective Date"), by and between Precision BioSciences, Inc. (the "Company"), and Matthew Kane ("Executive"). The Company and Executive are sometimes referred to in this Agreement individually as a "Party" and collectively as the "Parties."

BACKGROUND

A. Executive is a co-founder of the Company and has been its President and Chief Executive Officer since 2006. In addition, he entered into an Employment Agreement, dated June 14, 2015 (the "Prior Agreement"), the terms of which are currently in effect. Executive and the Company wish to update the Prior Agreement, and provide for additional compensation and benefits to Executive.

B. Both Executive and the Company wish to continue the employment relationship on the updated terms set forth in this Agreement, which provide Executive with greater benefits than those under the Prior Agreement, some of which will be conditioned upon the Company's consummation of its initial public offering (the "IPO"), which offering will be effective with the filing of an effective registration statement under the Securities Act of 1933, as amended (the "Effective Date of the IPO"). This Agreement is intended to replace and supersede the Prior Agreement as of the Effective Date of this Agreement.

NOW, THEREFORE, in consideration of the foregoing, of the mutual promises herein, and of other good and valuable consideration, including the continued employment of the Executive by the Company and the compensation to be received by the Executive from the Company from time to time, and specifically the compensation to be received by the Executive pursuant to Section 4 hereof, the receipt and sufficiency of which are hereby acknowledged, the parties hereto, intending legally to be bound, hereby agree as follows:

1. EMPLOYMENT. As of the Effective Date, the Company hereby continues to employ the Executive and Executive hereby accepts employment as the President and Chief Executive Officer of the Company upon the terms and conditions of this Agreement. As of the Effective Date, the parties agree that the Prior Agreement shall terminate.

2. NATURE OF EMPLOYMENT/DUTIES. Executive shall serve as President and Chief Executive Officer of the Company and shall have such responsibilities and authority as the Board of Directors of the Company (the "Board") may designate from time to time consistent with Executive's title and position. Executive shall report to the Board.

2.1 Executive shall perform all duties and exercise all authority in accordance with, and otherwise comply with, all Company policies, procedures, practices and directions.

2.2 Executive shall devote substantially all working time, best efforts, knowledge and experience to perform successfully Executive's duties and advance the Company's interests. During Executive's employment, Executive may, with the Board's consent (which shall not be unreasonably withheld), engage in other business activities for compensation (including board memberships), provided that, such activities do not present a conflict of interest nor violate the Restrictive Covenant Agreement (defined in Section 6), nor otherwise prohibit Executive from fulfilling Executive's obligations hereunder.

3. COMPENSATION.

3.1 Base Salary. Executive's initial annual base salary for all services rendered shall be Three Hundred Fifty Thousand and 00/100 Dollars ($350,000) (less applicable taxes and withholdings) payable in accordance with the Company's payroll practices as they may exist from time to time (such salary, as adjusted in accordance with this Section 3.1, referred to herein as "Base Salary"). Effective as of the Effective Date of the IPO, Executive's Base Salary shall be raised to Five Hundred Twenty Three Thousand and 00/100 Dollars ($523,000) (less applicable taxes and withholdings). Base Salary may be reviewed and adjusted by the Company, at its discretion, in accordance with the Company's policies, procedures, and practices as they may exist from time to time, provided that the Base Salary shall not be decreased unless the decrease is an across-the-board decrease for all senior management employees of the Company.

3.2 Business Expenses. Executive shall be reimbursed for reasonable and necessary expenses actually incurred by Executive in performing services under this Agreement in accordance with and subject to the terms and conditions of the applicable Company reimbursement policies, procedures, and practices as they may exist from time to time. All such reimbursements shall be made no later than the end of the calendar year following the year in which the expense was incurred

3.3 Bonus. Executive may participate in any Company bonus plan the Company may adopt for senior management subject to the terms, conditions, and any eligibility requirements that may exist in such plan or plans. Effective as of the Effective Date of the IPO, Executive's annual incentive compensation under such bonus plan (the "Annual Bonus") shall be targeted at 50% of Executive's Base Salary (such target, as may be increased by the Board from time to time, the "Target Annual Bonus"). The Annual Bonus payable under the bonus plan shall be based on the achievement of performance goals to be determined by the Board. The payment of any Annual Bonus pursuant to the bonus plan shall be subject to Executive's continued employment with the Company through the date of payment.

3.4 Equity. Executive shall be eligible to participate in any equity compensation plan or similar program adopted by the Company when approved by the Board and, if applicable, the Company's shareholders, for executives at Executive's level. The amount awarded, if any, to the Executive under any such plan shall be in the discretion of the Board or any committee administering such plan and shall be subject to the terms and conditions of any plan or program adopted or approved by the Board.

3.5 Benefits. Executive may participate in all medical, dental and disability insurance, 401(k), personal leave and other employee benefit plans and programs of the Company for which Executive is eligible, provided, however, that Executive's participation in benefit plans and programs is subject to the applicable terms, conditions and eligibility requirements of these plans and programs, some of which are within the plan administrator's discretion, as they may exist from time to time. The Company shall pay annual dues and expenses for Executive's membership and participation in such professional organizations as may be approved by the Board.

4. TERM OF EMPLOYMENT AND TERMINATION. The Company and Executive acknowledge that Executive's employment is and shall continue to be "at-will," as defined under applicable law, and that Executive's employment with the Company may be terminated by either Party at any time for any or no reason (subject to the notice requirements of this Section 4). This "at-will" nature of Executive's employment shall remain unchanged during Executive's tenure as an employee and may not be changed, except in an express writing signed by Executive and a duly authorized officer of the Company. The term of this Agreement and Executive's employment hereunder shall commence on the Effective Date and continue until terminated as set forth in this Section 4. The date on which Executive's employment terminates, as determined by the Company, regardless of the reason, shall be referred to herein as the "Separation Date." Upon termination of Executive's employment for any reason, Executive shall be deemed to have resigned from all offices and directorships, if any, then held with the Company or any of its subsidiaries.

4.1 Without Cause, Upon Notice. Either the Company or Executive may terminate Executive's employment and this Agreement without Cause at any time upon giving the other party thirty (30) days' written notice.

4.2 For Cause. The Company may terminate Executive's employment and this Agreement immediately without notice at any time for "Cause," which shall mean the following:

4.2.1 Executive's material failure to perform Executive's duties or to carryout the reasonable and lawful instructions of the Board (other than any such failure resulting from incapacity due to physical or mental illness);

4.2.2 Executive's engagement in dishonesty, illegal conduct, or gross misconduct, which is, in each case, materially injurious to the Company or its affiliates;

4.2.3 Executive's embezzlement, misappropriation, or fraud, whether or not related to the Executive's employment with the Company;

4.2.4 Executive's conviction of or plea of guilty or nolo contendere to a crime that constitutes a felony (or state law equivalent) or a crime that constitutes a misdemeanor involving moral turpitude;

4.2.5 Executive's failure to cooperate with the Company in any investigation or formal proceeding;

4.2.6 Executive's material breach of any material obligation under this Agreement, the Restrictive Covenant Agreement (as defined in Section 6 hereof), or any other written agreement between the Executive and the Company; or

4.2.7 any material failure by Executive to comply with the Company's written policies or rules, as they may be in effect from time to time.

Provided, however, that prior to termination based on Sections 4.2.1, 4.2.7 or 4.2.8, Executive shall be given written notice of the facts allegedly constituting Cause and a ten (10) day opportunity to cure.

4.3 By Death or Disability. Executive's employment and this Agreement shall terminate upon Executive's Disability or death. For purposes of this Agreement, "Disability" shall mean Executive's inability, due to physical or mental incapacity, to perform the essential functions of Executive's job, with or without reasonable accommodation, for one hundred eighty (180) days out of any three hundred sixty-five (365) day period; provided however, in the event that the Company temporarily replaces the Executive, or transfers the Executive's duties or responsibilities to another individual on account of the Executive's inability to perform such duties due to a mental or physical incapacity which is, or is reasonably expected to become, a Disability, then the Executive's employment shall not be deemed terminated by the Company and the Executive shall not be able to resign with Good Reason as a result thereof. Any question as to the existence of the Executive's Disability as to which the Executive and the Company cannot agree shall be determined in writing by a qualified independent physician mutually acceptable to the Executive and the Company. If the Executive and the Company cannot agree as to a qualified independent physician, each shall appoint such a physician and those two physicians shall select a third who shall make such determination in writing. The determination of Disability made in writing to the Company and the Executive shall be final and conclusive for all purposes of this Agreement. The Company shall give Executive written notice of termination for Disability and the termination shall be effective as of the date specified in such notice.

4.4 For Good Reason. Executive may terminate Executive's employment for "Good Reason," which shall mean the occurrence of any of the following, in each case without the Executive's written consent:

4.4.1 a material reduction in Executive's Base Salary other than a general reduction in Base Salary that affects all similarly situated executives;

4.4.2 a material, adverse change in Executive's title, authority, duties, or responsibilities (other than temporarily while the Executive is physically or mentally incapacitated or as required by applicable law), provided that this shall not apply following an acquisition of or merger by the company if Executive is provided with similar duties and authority in a larger organization;

4.4.3 an involuntary relocation of the Executive's principal place of employment by more than thirty five (35) miles; or

4.4.4 the Company's failure to obtain an agreement from any successor to the Company to assume and agree to perform this Agreement in the same manner and to the same extent that the Company would be required to perform if no succession had taken place, except where such assumption occurs by operation of law.

Executive cannot terminate Executive's employment for Good Reason unless Executive has provided written notice to the Company of the existence of the circumstances providing grounds for termination for Good Reason within thirty (30) days of the initial existence of such grounds and the Company has had at least thirty (30) days from the date on which such notice is provided to cure such circumstances. If the Executive does not terminate Executive's employment for Good Reason within sixty (60) days after the first occurrence of the applicable grounds, then the Executive will be deemed to have waived Executive's right to terminate for Good Reason with respect to such grounds.

5. COMPENSATION AND BENEFITS UPON TERMINATION. If Executive's employment terminates for any reason, Executive shall not be entitled to any payments, benefits, damages, award or compensation other than as provided in this Agreement or otherwise agreed to in writing by the Company or as provided by applicable law. Upon termination of Executive's employment pursuant to any of the circumstances listed in Section 4, Executive (or Executive's estate) shall be entitled to receive the sum of: (i) the portion of Executive's Base Salary earned through the Separation Date, but not yet paid to Executive; (ii) any expense reimbursements owed to Executive pursuant to Section 3.2; and (iii) any amount accrued and arising from Executive's participation in, or benefits accrued under any employee benefit plans, programs or arrangements, which amounts shall be payable in accordance with the terms and conditions of such employee benefit plans, programs or arrangements (collectively, the "Accrued Obligations"). Except as otherwise expressly required by law (e.g., COBRA) or as specifically provided herein, all of Executive's rights to salary, severance, benefits, bonuses and other compensatory amounts hereunder (if any) shall cease upon the termination of Executive's employment hereunder. In the event that Executive's employment is terminated by the Company for any reason, Executive's sole and exclusive remedy shall be to receive the payments and benefits described in this Section 5.

5.1 By the Company for Cause or because of Executive's Death or Disability, or by Executive Without Cause, Upon Notice. If Executive's employment and this Agreement are terminated by the Company for Cause or because of Executive's death or Disability, or by Executive pursuant to Section 4.1 (Without Cause, Upon Notice), then the Company's obligation to compensate Executive ceases on the Separation Date except for the Accrued Obligations.

5.2 By the Company Without Cause or by Executive for Good Reason. If the Company terminates Executive's employment and this Agreement pursuant to Section 4.1 (Without Cause, Upon Notice) or Executive terminates Executive's employment and this Agreement pursuant to Section 4.4 (for Good Reason), subject to Executive's continued compliance with Executive's obligations under the Restrictive Covenant Agreement then the Company shall pay Executive the Accrued Obligations and subject to Section 5.5 (Required Release), Executive shall be entitled to the following:

5.2.1 pay Executive an amount equal to twelve (12) months of Executive's then current monthly base salary (less applicable taxes and withholdings) (referred to as the "Severance Period"), payable in substantially equal monthly installments on the same payroll schedule applicable to Executive immediately prior to Executive's separation from service and commencing on the first such payroll date on or following the date on which the release of claims required by Section 5.5 becomes effective and non-revocable, but not later than ninety (90) days following termination from employment; provided however that if the 90th day following Executive's termination from employment occurs in the year following the year in which Executive's termination occurs, then the payments shall commence no earlier than January 1 of such subsequent year and provided further that if such payments commence in such subsequent year, the first such payment shall be a lump sum in an amount equal to the payments that would have come due since Executive's separation from service, and

5.2.2 If Executive timely and properly elects health continuation coverage under the Consolidated Omnibus Budget Reconciliation Act of 1985 ("COBRA"), during the Severance Period, the Company shall reimburse Executive for the difference between the monthly COBRA premium paid by the Executive for and the monthly premium amount paid by Executive immediately prior to the date that Executive's employment terminated. Such reimbursement shall be paid to the Executive on or before the tenth (10th) day of the month immediately following the month in which the Executive timely remits the premium payment, with such reimbursements to commence when the payments under Section 5.2.1 commence. Executive shall be eligible to receive such reimbursement until the earliest of: (i) the twelfth-month anniversary of the Separation Date; (ii) the date the Executive is no longer eligible to receive COBRA continuation coverage; and (iii) the date on which the Executive becomes eligible to receive substantially similar coverage from another employer or other source. Notwithstanding the foregoing, if the Company's making payments under this Section 5.2.2 would violate the nondiscrimination rules applicable to non-grandfathered plans under the Affordable Care Act (the "ACA"), or result in the imposition of penalties under the ACA and the related regulations and guidance promulgated thereunder), the parties agree to reform this Section 5.2.2 in a manner as is necessary to comply with the ACA. Executive shall provide the Company with notice of subsequent employment and comparable coverage within thirty (30) days of commencement of such comparable coverage.

5.3 Following a Change in Control, by the Company Without Cause or by Executive for Good Reason. If within three (3) month prior to or twelve (12) months following the occurrence of a Change in Control, as defined herein, either the Company terminates Executive's employment and this Agreement pursuant to Section 4.1 (Without Cause, Upon Notice) or Executive terminates Executive's employment and this Agreement pursuant to Section 4.4 (for Good Reason), then in lieu of any benefits under Section 5.2, and subject to Executive's continue compliance with Executive's obligations under the Restrictive Covenant Agreement, the Company shall pay Executive the Accrued Obligations and, subject to Section 5.5 (Required Release), Executive shall be entitled to the following:

5.3.1 The Company shall pay Executive an amount equal to eighteen (18) months of Executive's then current monthly base salary (less applicable taxes and withholdings) (the "CIC Severance Period") plus 1.5 times Executive's target bonus for the year during which the Separation Date occurs, payable in lump sum Seventy-five (75) days following the Separation Date;

5.3.2 If Executive timely and properly elects health continuation coverage under COBRA, during the CIC Severance Period, the Company shall reimburse Executive for the difference between the monthly COBRA premium paid by the Executive for and the monthly premium amount paid by Executive immediately prior to the date that Executive's employment terminated. Such reimbursement shall be paid to the Executive on or before the tenth (10th) day of the month immediately following the month in which Executive timely remits the premium payment, with such reimbursements to commence in the month following the month the release under Section 5.4 becomes effective and non-revocable. Executive shall be eligible to receive such reimbursement until the earliest of: (i) the twelfth-month anniversary of the Separation Date; (ii) the date the Executive is no longer eligible to receive COBRA continuation coverage; and (iii) the date on which the Executive becomes eligible to receive substantially similar coverage from another employer or other source. Notwithstanding the foregoing, if the Company's making payments under this Section 5.3.2 would violate the nondiscrimination rules applicable to non-grandfathered plans under the ACA, or result in the imposition of penalties under the ACA and the related regulations and guidance promulgated thereunder), the parties agree to reform this Section 5.3.2 in a manner as is necessary to comply with the ACA. Executive shall provide the Company with notice of subsequent employment and comparable coverage within thirty (30) days of commencement of such comparable coverage; and

5.3.3 All unvested time-based equity grants shall vest in full as of the Separation Date, provided that such equity shall remain subject to the other terms and conditions of the applicable Company incentive award plan(s) and individual award agreement(s).

5.4 Definition of Change in Control.

5.4.1 "Change in Control" means and includes each of the following:

(a) A transaction or series of transactions (other than an offering of Common Stock to the general public through a registration statement filed with the Securities and Exchange Commission or a transaction or series of transactions that meets the requirements of clauses (i) and (ii) of subsection (c) below) whereby any "person" or related "group" of "persons" (as such terms are used in Sections 13(d) and 14(d)(2) of the Securities Exchange Act of 1934, as amended (the "Exchange Act")) (other than the Company, any of its Subsidiaries, an employee benefit plan maintained by the Company or any of its Subsidiaries or a "person" that, prior to such transaction, directly or indirectly controls, is controlled by, or is under common control with, the Company) directly or indirectly acquires beneficial ownership (within the meaning of Rule 13d-3 under the Exchange Act) of securities of the Company possessing more than 50% of the total combined voting power of the Company's securities outstanding immediately after such acquisition; provided, however, that for purposes of this Agreement, "Subsidiary" means any entity (other than the Company), whether domestic or foreign, in an unbroken chain of entities beginning with the Company if each of the entities other than the last entity in the unbroken chain beneficially owns, at the time of the determination, securities or interests representing at least 50% of the total combined voting power of all classes of securities or interests in one of the other entities in such chain; or

(b) During any period of two consecutive years, individuals who, at the beginning of such period, constitute the Board (defined in Section 2) together with any new director(s) of the Board (other than a director designated by a person who shall have entered into an agreement with the Company to effect a transaction described in subsections (a) or (c)) whose election by the Board or nomination for election by the Company's stockholders was approved by a vote of at least two-thirds of the directors then still in office who either were directors at the beginning of the two-year period or whose election or nomination for election was previously so approved, cease for any reason to constitute a majority thereof; or

(c) The consummation by the Company (whether directly involving the Company or indirectly involving the Company through one or more intermediaries) of (x) a merger, consolidation, reorganization, or business combination or (y) a sale or other disposition of all or substantially all of the Company's assets in any single transaction or series of related transactions or (z) the acquisition of assets or stock of another entity, in each case other than a transaction:

(i) which results in the Company's voting securities outstanding immediately before the transaction continuing to represent (either by remaining outstanding or by being converted into voting securities of the Company or the person that, as a result of the transaction, controls, directly or indirectly, the Company or owns, directly or indirectly, all or substantially all of the Company's assets or otherwise succeeds to the business of the Company (the Company or such person, the "Successor Entity")) directly or indirectly, at least a majority of the combined voting power of the Successor Entity's outstanding voting securities immediately after the transaction, and

(ii) after which no person or group beneficially owns voting securities representing 50% or more of the combined voting power of the Successor Entity; provided, however, that no person or group shall be treated for purposes of this clause (ii) as beneficially owning 50% or more of the combined voting power of the Successor Entity solely as a result of the voting power held in the Company prior to the consummation of the transaction.

5.4.2 Notwithstanding the foregoing, (i) a Change in Control shall not include an IPO (referenced in Background, Section B of this Agreement); and (ii) if a Change in Control constitutes a payment event under this Agreement that provides for the deferral of compensation that is subject to Section 409A of the Internal Revenue Code of 1986, as amended (the "Code"), and the regulations thereunder (collectively, "Section 409A"), to the extent required to avoid the imposition of additional taxes under Section 409A, the transaction or event described in subsection (a), (b) or (c) with respect to such payment (or portion thereof) shall only constitute a Change in Control for purposes of the payment timing if such transaction also constitutes a "change in control event," as defined in Treasury Regulation Section 1.409A-3(i)(5).

5.4.3 The Company shall have full and final authority, which shall be exercised in its discretion, to determine conclusively whether a Change in Control has occurred pursuant to the above definition, the date of the occurrence of such Change in Control and any incidental matters relating thereto; provided that any exercise of authority in conjunction with a determination of whether a Change in Control is a "change in control event" as defined in Treasury Regulation Section 1.409A-3(i)(5) shall be consistent with such regulation.

5.5 Required Release. Notwithstanding any provision of this Agreement to the contrary, the Company's obligation to provide the payments and reimbursements under Sections 5.2.1, 5.2.2, 5.3.1 and 5.3.2 is conditioned upon Executive's execution of a standard form of an enforceable release of claims and Executive's compliance with the Restrictive Covenant Agreement. If Executive chooses not to execute such a release or fails to comply with the Restrictive Covenant Agreement, then the Company's obligation to compensate Executive ceases on the Separation Date except as to amounts due at the time. The release of claims shall be provided to Executive within ten (10) days of Executive's separation from service and Executive must execute it within the time period specified in the release (which shall not be longer than forty-five (45) days from the date of receipt). Such release shall not be effective until any applicable revocation period has expired.

5.6 Benefits in Lieu of Other Severance. Executive is not entitled to receive any compensation or benefits upon Executive's termination except as: (i) set forth in this Agreement; (ii) otherwise required by law; or (iii) otherwise required by any employee benefit plan in which Executive participates. Moreover, the terms and conditions afforded Executive under this Agreement are in lieu of any severance benefits to which Executive otherwise might be entitled pursuant to any severance plan, policy and practice of the Company.

6. RESTRICTIVE COVENANTS. Executive shall continue to be obligated under the Proprietary Information, Inventions, Non-Competition and Non-Solicitation Agreement, dated May 17, 2017 (the "Restrictive Covenant Agreement"). Executive agrees to abide by the terms of the Restrictive Covenant Agreement, or any other subsequent agreement with the Company relating to proprietary information, inventions, intellectual property, non-competition or non-solicitation, the terms of which are hereby incorporated by reference into this Agreement. Executive acknowledges that the provisions of the Restrictive Covenant Agreement, or any subsequent similar agreement, will survive the termination of Executive's employment and/or the termination of this Agreement.

7. COMPANY PROPERTY. Upon the termination of Executive's employment or upon Company's earlier request, Executive shall: (i) deliver to the Company all records, memoranda, data, documents and other property of any description which refer or relate in any way to trade secrets or confidential information, including all copies thereof, which are in Executive's possession, custody or control; (ii) deliver to the Company all Company property (including, but not limited to, keys, credit cards, customer files, contracts, proposals, work in process, manuals, forms, computer-stored work in process and other computer data, research materials, other items of business information concerning any Company customer, or Company business or business methods, including all copies thereof) which is in Executive's possession, custody or control; (iii) bring all such records, files and other materials up to date before returning them; and (iv) fully cooperate with the Company in winding up Executive's work and transferring that work to other individuals designated by the Company.

8. EMPLOYEE REPRESENTATION. Executive represents and warrants that Executive's employment and obligations under this Agreement will not (i) breach any duty or obligation Executive owes to another or (ii) violate any law, recognized ethics standard or recognized business custom.

9. AMENDMENTS; WAIVERS. This Agreement may not be modified, amended, or terminated except by an instrument in writing, signed by Executive and a duly authorized officer of Company. By an instrument in writing similarly executed, Executive or a duly authorized officer of the Company may waive compliance by the other Party with any specifically identified provision of this Agreement that such other Party was or is obligated to comply with or perform; *provided*, *however*, that such waiver shall not operate as a waiver of, or estoppel with respect to, any other or subsequent failure. No failure to exercise and no delay in exercising any right, remedy, or power hereunder will preclude any other or further exercise of any other right, remedy, or power provided herein or by law or in equity.

10. ENTIRE AGREEMENT. Except as expressly provided in this Agreement, this Agreement: (i) supersedes and cancels all other understandings and agreements, oral or written, with respect to Executive's employment with the Company; (ii) supersedes all other understandings and agreements, oral or written, between the parties with respect to the subject matter of this Agreement; and (iii) constitutes the sole agreement between the parties with respect to this subject matter. Each party acknowledges that: (i) no representations, inducements, promises or agreements, oral or written, have been made by any party or by anyone acting on behalf of any party, which are not embodied in this Agreement; and (ii) no agreement, statement or promise not contained in this Agreement shall be valid. No change or modification of this Agreement shall be valid or binding upon the parties unless such change or modification is in writing and is signed by the parties.

11. SEVERABILITY. If a court of competent jurisdiction holds that any provision or sub-part thereof contained in this Agreement is invalid, illegal, or unenforceable, that invalidity, illegality, or unenforceability shall not affect any other provision in this Agreement.

12. ASSIGNMENT AND SUCCESSORS. The Company may assign its rights and obligations under this Agreement to any of its affiliates or to any successor to all or substantially all of the business or the assets of the Company (by merger or otherwise), and may assign or encumber this Agreement and its rights hereunder as security for indebtedness of the Company and its affiliates. This Agreement shall be binding upon and inure to the benefit of the Company, Executive and their respective successors, assigns, personnel and legal representatives, executors, administrators, heirs, distributees, devisees, and legatees, as applicable. None of Executive's rights or obligations may be assigned or transferred by Executive, other than Executive's rights to payments hereunder, which may be transferred only by will or operation of law.

13. GOVERNING LAW. This Agreement shall be construed, interpreted, and governed in accordance with and by North Carolina law and the applicable provisions of federal law ("Applicable Federal Law"). Any and all claims, controversies, and causes of action arising out of or relating to this Agreement, whether sounding in contract, tort, or statute, shall be governed by the laws of the state of North Carolina, including its statutes of limitations, except for Applicable Federal Law, without giving effect to any North Carolina conflict-of-laws rule that would result in the application of the laws of a different jurisdiction. Both Executive and the Company acknowledge and agree that the state or federal courts located in North Carolina have personal jurisdiction over them and over any dispute arising under this Agreement, and both Executive and the Company irrevocably consent to the jurisdiction of such courts.

14. COUNTERPARTS. This Agreement may be executed in counterparts, each of which shall be an original, with the same effect as if the signatures affixed thereto were upon the same instrument.

15. NOTICES. Any notice, request, claim, demand, document and other communication hereunder to any Party shall be effective upon receipt (or refusal of receipt) and shall be in writing and delivered personally or sent by facsimile or certified or registered mail, postage prepaid, as follows:

15.1 If to the Company, to the Chief Executive Officer of the Company at the Company's headquarters,

15.2 If to Executive, to the last address that the Company has in its personnel records for Executive, or

15.3 At any other address as any Party shall have specified by notice in writing to the other Party.

16. SECTION 409A OF THE INTERNAL REVENUE CODE. The parties intend that the provisions of this Agreement comply with Section 409A of the Code and all provisions of this Agreement shall be construed in a manner consistent with the requirements for avoiding taxes or penalties under Section 409A. If any provision of this Agreement (or of any award of compensation, including equity compensation or benefits) would cause Executive to incur any additional tax or interest under Section 409A, the Company shall, upon the specific request of Executive, use its reasonable business efforts to in good faith reform such provision to comply with Code Section 409A; provided, that to the maximum extent practicable, the original intent and economic benefit to Executive and the Company of the applicable provision shall be maintained, and the Company shall have no obligation to make any changes that could create any additional economic cost or loss of benefit to the Company. The Company shall timely use its reasonable business efforts to amend any plans and programs in which Executive participates to bring it in compliance with Section 409A. Notwithstanding the foregoing, the Company shall have no liability with regard to any failure to comply with Section 409A so long as it has acted in good faith with regard to compliance therewith.

16.1 Separation from Service. A termination of employment shall not be deemed to have occurred for purposes of any provision of this Agreement providing for the payment of any amounts or benefits upon or following a termination of employment unless such termination also constitutes a "Separation from Service" within the meaning of Section 409A and, for purposes of any such provision of this Agreement, references to a "termination," "termination of employment," "separation from service" or like terms shall mean Separation from Service.

16.2 Separate Payments. Each installment payment required under this Agreement shall be considered a separate payment for purposes of Section 409A.

16.3 Delayed Distribution to Specified Employee. If the Company determines in accordance with Sections 409A and 416(i) of the Code and the regulations promulgated thereunder, in the Company's sole discretion, that Executive is a Specified Employee of the Company on the date Executive's employment with the Company terminates and that a delay in

benefits provided under this Agreement is necessary to comply with Code Section 409A(A)(2)(B)(i), then any severance payments and any continuation of benefits or reimbursement of benefit costs provided by this Agreement, and not otherwise exempt from Section 409A, shall be delayed for a period of six (6) months following the date of termination of Executive's employment (the "409A Delay Period"). In such event, any severance payments and the cost of any continuation of benefits provided under this Agreement that would otherwise be due and payable to Executive during the 409A Delay Period shall be paid to Executive in a lump sum cash amount in the month following the end of the 409A Delay Period. For purposes of this Agreement, "Specified Employee" shall mean an employee who, on an Identification Date ("Identification Date" shall mean each December 31) is a specified employee as defined in Section 416(i) of the Code without regard to paragraph (5) thereof. If Executive is identified as a Specified Employee on an Identification Date, then Executive shall be considered a Specified Employee for purposes of this Agreement during the period beginning on the first April 1 following the Identification Date and ending on the following March 31.

16.4 Reimbursements. To the extent required by Section 409A, each reimbursement or in-kind benefit provided under this Agreement shall be provided in accordance with the following: (a) the amount of expenses eligible for reimbursement, or in-kind benefits provided, during each calendar year cannot affect the expenses eligible for reimbursement, or in-kind benefits to be provided, in any other calendar year; (b) any reimbursement of an eligible expense shall be paid to Executive on or before the last day of the calendar year following the calendar year in which the expense was incurred; and (c) any right to reimbursements or in-kind benefits under this Agreement shall not be subject to liquidation or exchange for another benefit.

17. PARACHUTE PAYMENTS. Notwithstanding any other provisions of this Agreement or any Company equity plan or agreement, in the event that any payment or benefit by the Company or otherwise to or for the benefit of Executive, whether paid or payable or distributed or distributable pursuant to the terms of this Agreement or otherwise (all such payments and benefits, including the payments and benefits under Section 5 hereof, being hereinafter referred to as the "Total Payments"), would be subject (in whole or in part) to the excise tax imposed by Section 4999 of the Code (the "Excise Tax"), then the Total Payments shall be reduced (in the order provided in Section 16.1) to the minimum extent necessary to avoid the imposition of the Excise Tax on the Total Payments, but only if (i) the net amount of such Total Payments, as so reduced (and after subtracting the net amount of federal, state and local income and employment taxes on such reduced Total Payments and after taking into account the phase out of itemized deductions and personal exemptions attributable to such reduced Total Payments), is greater than or equal to (ii) the net amount of such Total Payments without such reduction (but after subtracting the net amount of federal, state and local income and employment taxes on such Total Payments and the amount of the Excise Tax to which Executive would be subject in respect of such unreduced Total Payments and after taking into account the phase out of itemized deductions and personal exemptions attributable to such unreduced Total Payments).

17.1 Order of Reduction. The Total Payments shall be reduced in the following order: (i) reduction on a pro-rata basis of any cash severance payments that are exempt from Section 409A of the Code, (ii) reduction on a pro-rata basis of any non-cash severance payments or benefits that are exempt from Section 409A, (iii) reduction on a pro-rata basis of any other payments or benefits that are exempt from Section 409A, and (iv) reduction of any payments or

benefits otherwise payable to Executive on a pro-rata basis or such other manner that complies with Section 409A; provided, in case of clauses (ii), (iii) and (iv), that reduction of any payments attributable to the acceleration of vesting of Company equity awards shall be first applied to Company equity awards that would otherwise vest last in time.

17.2 Determinations. All determinations regarding the application of this Section 17 shall be made by an accounting firm or consulting group with experience in performing calculations regarding the applicability of Section 280G of the Code and the Excise Tax selected by the Company (the "Independent Advisors"). For purposes of determinations, no portion of the Total Payments shall be taken into account which, in the opinion of the Independent Advisors, (i) does not constitute a "parachute payment" within the meaning of Section 280G(b)(2) of the Code (including by reason of Section 280G(b)(4)(A) of the Code) or (ii) constitutes reasonable compensation for services actually rendered, within the meaning of Section 280G(b)(4)(B) of the Code, in excess of the "base amount" (as defined in Section 280G(b)(3) of the Code) allocable to such reasonable compensation. The costs of obtaining such determination and all related fees and expenses (including related fees and expenses incurred in any later audit) shall be borne by the Company.

17.3 Additional Reductions. In the event it is later determined that a greater reduction in the Total Payments should have been made to implement the objective and intent of this Section 17, the excess amount shall be returned promptly by Executive to the Company.

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IN WITNESS WHEREOF, the parties have entered into this Agreement on the day and year first written above.

MATTHEW KANE

/s/ Matthew Kane

PRECISION BIOSCIENCES, INC.

By: /s/ Mike Nicholson

Title: Chief People Officer

AMENDED AND RESTATED
EXECUTIVE EMPLOYMENT AGREEMENT

This Amended and Restated Executive Employment Agreement (the "Agreement") is made and entered into as of this 27th day of February, 2019 (the "Effective Date"), by and between Precision BioSciences, Inc. (the "Company"), and Derek Jantz ("Executive"). The Company and Executive are sometimes referred to in this Agreement individually as a "Party" and collectively as the "Parties."

BACKGROUND

A. Executive has been employed by the Company and subject to the terms of an Employment Agreement, dated July 23, 2015 (the "Prior Agreement"), the terms of which are currently in effect. Executive and the Company wish to update the Prior Employment Agreement, and provide for additional compensation and benefits to Executive.

B. Both Executive and the Company wish to continue the employment relationship on the updated terms set forth in this Agreement, which provide Executive with greater benefits than those under the Prior Agreement, some of which will be conditioned upon the Company's consummation of its initial public offering (the "IPO"), which offering will be effective with the filing of an effective registration statement under the Securities Act of 1933, as amended (the "Effective Date of the IPO"). This Agreement is intended to replace and supersede the Prior Agreement as of the Effective Date of this Agreement.

NOW, THEREFORE, in consideration of the foregoing, of the mutual promises herein, and of other good and valuable consideration, including the continued employment of the Executive by the Company and the compensation to be received by the Executive from the Company from time to time, and specifically the compensation to be received by the Executive pursuant to Section 4 hereof, the receipt and sufficiency of which are hereby acknowledged, the parties hereto, intending legally to be bound, hereby agree as follows:

1. EMPLOYMENT. As of the Effective Date, the Company hereby continues to employ the Executive and Executive hereby accepts employment as the Chief Scientific Officer of the Company upon the terms and conditions of this Agreement. As of the Effective Date, the parties agree that the Prior Agreement shall terminate.

2. NATURE OF EMPLOYMENT/DUTIES. Executive shall serve as the Chief Scientific Officer of the Company and shall have such responsibilities and authority as the Company may designate from time to time consistent with Executive's title and position.

2.1 Executive shall perform all duties and exercise all authority in accordance with, and otherwise comply with, all Company policies, procedures, practices and directions.

2.2 Executive shall devote substantially all working time, best efforts, knowledge and experience to perform successfully Executive's duties and advance the Company's interests. During Executive's employment, Executive may, with the Board's consent (which shall not be unreasonably withheld), engage in other business activities for compensation (including board memberships), provided that, such activities do not present a conflict of interest nor violate the Restrictive Covenant Agreement (defined in Section 6), nor otherwise prohibit Executive from fulfilling Executive's obligations hereunder.

3. COMPENSATION.

3.1 Base Salary. Executive's initial annual base salary for all services rendered shall be Three Hundred Fifty Thousand and 00/100 Dollars ($350,000) (less applicable taxes and withholdings) payable in accordance with the Company's payroll practices as they may exist from time to time (such salary, as adjusted in accordance with this Section 3.1, referred to herein as "Base Salary"). Effective as of the Effective Date of the IPO, Executive's Base Salary shall be raised to Four Hundred Twenty Thousand and 00/100 Dollars ($420,000) (less applicable taxes and withholdings). Base Salary may be reviewed and adjusted by the Company, at its discretion, in accordance with the Company's policies, procedures, and practices as they may exist from time to time, provided that the Base Salary shall not be decreased unless the decrease is an across-the-board decrease for all senior management employees of the Company.

3.2 Business Expenses. Executive shall be reimbursed for reasonable and necessary expenses actually incurred by Executive in performing services under this Agreement in accordance with and subject to the terms and conditions of the applicable Company reimbursement policies, procedures, and practices as they may exist from time to time. All such reimbursements shall be made no later than the end of the calendar year following the year in which the expense was incurred.

3.3 Bonus. Executive may participate in any Company bonus plan the Company may adopt for senior management subject to the terms, conditions, and any eligibility requirements that may exist in such plan or plans. Effective as of the Effective Date of the IPO, Executive's annual incentive compensation under such bonus plan (the "Annual Bonus") shall be targeted at 40% of Executive's Base Salary (such target, as may be increased by the Board from time to time, the "Target Annual Bonus"). The Annual Bonus payable under the bonus plan shall be based on the achievement of performance goals to be determined by the Board. The payment of any Annual Bonus pursuant to the bonus plan shall be subject to Executive's continued employment with the Company through the date of payment.

3.4 Equity. Executive shall be eligible to participate in any equity compensation plan or similar program adopted by the Company when approved by the Board and, if applicable, the Company's shareholders, for executives at Executive's level. The amount awarded, if any, to the Executive under any such plan shall be in the discretion of the Board or any committee administering such plan and shall be subject to the terms and conditions of any plan or program adopted or approved by the Board.

3.5 Benefits. Executive may participate in all medical, dental and disability insurance, 401(k), personal leave and other employee benefit plans and programs of the Company for which Executive is eligible, provided, however, that Executive's participation in benefit plans and programs is subject to the applicable terms, conditions and eligibility requirements of these plans and programs, some of which are within the plan administrator's discretion, as they may exist from time to time. The Company shall pay annual dues and expenses for Executive's membership and participation in such professional organizations as may be approved by the Board.

4. TERM OF EMPLOYMENT AND TERMINATION. The Company and Executive acknowledge that Executive's employment is and shall continue to be "at-will," as defined under applicable law, and that Executive's employment with the Company may be terminated by either Party at any time for any or no reason (subject to the notice requirements of this Section 4). This "at-will" nature of Executive's employment shall remain unchanged during Executive's tenure as an employee and may not be changed, except in an express writing signed by Executive and a duly authorized officer of the Company. The term of this Agreement and Executive's employment hereunder shall commence on the Effective Date and continue until terminated as set forth in this Section 4. The date on which Executive's employment terminates, as determined by the Company, regardless of the reason, shall be referred to herein as the "Separation Date." Upon termination of Executive's employment for any reason, Executive shall be deemed to have resigned from all offices and directorships, if any, then held with the Company or any of its subsidiaries.

4.1 Without Cause, Upon Notice. Either the Company or Executive may terminate Executive's employment and this Agreement without Cause at any time upon giving the other party thirty (30) days written notice.

4.2 For Cause. The Company may terminate Executive's employment and this Agreement immediately without notice at any time for "Cause," which shall mean the following:

4.2.1 Executive's material failure to perform Executive's duties or to carryout the reasonable and lawful instructions of the Chief Executive Officer or the Board of Directors (other than any such failure resulting from incapacity due to physical or mental illness);

4.2.2 Executive's engagement in dishonesty, illegal conduct, or gross misconduct, which is, in each case, materially injurious to the Company or its affiliates;

4.2.3 Executive's embezzlement, misappropriation, or fraud, whether or not related to the Executive's employment with the Company;

4.2.4 Executive's conviction of or plea of guilty or nolo contendere to a crime that constitutes a felony (or state law equivalent) or a crime that constitutes a misdemeanor involving moral turpitude;

4.2.5 Executive's failure to cooperate with the Company in any investigation or formal proceeding;

4.2.6 Executive's material breach of any material obligation under this Agreement, the Restrictive Covenant Agreement (as defined in Section 6), or any other written agreement between the Executive and the Company; or

4.2.7 any material failure by Executive to comply with the Company's written policies or rules, as they may be in effect from time to time.

Provided, however, that prior to termination based on Sections 4.2.1, 4.2.7 or 4.2.8, Executive shall be given written notice of the facts allegedly constituting Cause and a ten (10) day opportunity to cure.

4.3 By Death or Disability. Executive's employment and this Agreement shall terminate upon Executive's Disability or death. For purposes of this Agreement, "Disability" shall mean Executive's inability, due to physical or mental incapacity, to perform the essential functions of Executive's job, with or without reasonable accommodation, for one hundred eighty (180) days out of any three hundred sixty-five (365) day period; provided however, in the event that the Company temporarily replaces the Executive, or transfers the Executive's duties or responsibilities to another individual on account of the Executive's inability to perform such duties due to a mental or physical incapacity which is, or is reasonably expected to become, a Disability, then the Executive's employment shall not be deemed terminated by the Company. Any question as to the existence of the Executive's Disability as to which the Executive and the Company cannot agree shall be determined in writing by a qualified independent physician mutually acceptable to the Executive and the Company. If the Executive and the Company cannot agree as to a qualified independent physician, each shall appoint such a physician and those two physicians shall select a third who shall make such determination in writing. The determination of Disability made in writing to the Company and the Executive shall be final and conclusive for all purposes of this Agreement. The Company shall give Executive written notice of termination for Disability and the termination shall be effective as of the date specified in such notice.

4.4 For Good Reason. Executive may terminate Executive's employment for "Good Reason," which shall mean the occurrence of any of the following, in each case without the Executive's written consent:

4.4.1 a material reduction in Executive's Base Salary other than a general reduction in Base Salary that affects all similarly situated executives;

4.4.2 an involuntary relocation of the Executive's principal place of employment by more than thirty five (35) miles; or

4.4.3 the Company's failure to obtain an agreement from any successor to the Company to assume and agree to perform this Agreement in the same manner and to the same extent that the Company would be required to perform if no succession had taken place, except where such assumption occurs by operation of law.

Executive cannot terminate Executive's employment for Good Reason unless Executive has provided written notice to the Company of the existence of the circumstances providing grounds for termination for Good Reason within thirty (30) days of the initial existence of such grounds and the Company has had at least thirty (30) days from the date on which such notice is provided to cure such circumstances. If the Executive does not terminate Executive's employment for Good Reason within sixty (60) days after the first occurrence of the applicable grounds, then the Executive will be deemed to have waived Executive's right to terminate for Good Reason with respect to such grounds.

5. COMPENSATION AND BENEFITS UPON TERMINATION. If Executive's employment terminates for any reason, Executive shall not be entitled to any payments, benefits, damages, award or compensation other than as provided in this Agreement or otherwise agreed to in writing by the Company or as provided by applicable law. Upon termination of Executive's employment pursuant to any of the circumstances listed in Section 4, Executive (or Executive's estate) shall be entitled to receive the sum of: (i) the portion of Executive's Base Salary earned through the Separation Date, but not yet paid to Executive; (ii) any expense reimbursements owed to Executive pursuant to Section 3.2; and (iii) any amount accrued and arising from Executive's participation in, or benefits accrued under any employee benefit plans, programs or arrangements, which amounts shall be payable in accordance with the terms and conditions of such employee benefit plans, programs or arrangements (collectively, the "Accrued Obligations"). Except as otherwise expressly required by law (e.g., COBRA) or as specifically provided herein, all of Executive's rights to salary, severance, benefits, bonuses and other compensatory amounts hereunder (if any) shall cease upon the termination of Executive's employment hereunder. In the event that Executive's employment is terminated by the Company for any reason, Executive's sole and exclusive remedy shall be to receive the payments and benefits described in this Section 5.

5.1 By the Company for Cause or because of Executive's Death or Disability, or by Executive Without Cause, Upon Notice. If Executive's employment and this Agreement are terminated by the Company for Cause or because of Executive's death or Disability, or by Executive pursuant to Section 4.1 (Without Cause, Upon Notice), then the Company's obligation to compensate Executive ceases on the Separation Date except for the Accrued Obligations.

5.2 By the Company Without Cause or by Executive for Good Reason. If the Company terminates Executive's employment and this Agreement pursuant to Section 4.1 (Without Cause, Upon Notice) or Executive terminates Executive's employment and this Agreement pursuant to Section 4.4 (for Good Reason), subject to Executive's continued compliance with Executive's obligations under the Restrictive Covenant Agreement then the Company shall pay Executive the Accrued Obligations and subject to Section 5.5 (Required Release), Executive shall be entitled to the following:

5.2.1 pay Executive an amount equal to nine (9) months of Executive's then current monthly base salary (less applicable taxes and withholdings (the "Severance Period"), payable in substantially equal monthly installments on the same payroll schedule applicable to Executive immediately prior to Executive's separation from service and commencing on the first such payroll date on or following the date on which the release of claims required by Section 5.5 becomes effective and non-revocable, but not later than ninety (90) days following termination from employment; provided however that if the 90th day following Executive's termination from employment occurs in the year following the year in which Executive's termination occurs, then the payments shall commence no earlier than January 1 of such subsequent year and provided further that if such payments commence in such subsequent year, the first such payment shall be a lump sum in an amount equal to the payments that would have come due since Executive's separation from service, and

5.2.2 If Executive timely and properly elects health continuation coverage under the Consolidated Omnibus Budget Reconciliation Act of 1985 ("COBRA"), during the Severance Period, the Company shall reimburse Executive for the difference between the monthly COBRA premium paid by the Executive for and the monthly premium amount paid by Executive immediately prior to the date that Executive's employment terminated. Such reimbursement shall be paid to the Executive on or before the tenth (10th) day of the month immediately following the month in which the Executive timely remits the premium payment, with such reimbursements to commence when the payments under Section 5.2.1 commence. Executive shall be eligible to receive such reimbursement until the earliest of: (i) the twelfth-month anniversary of the Separation Date; (ii) the date the Executive is no longer eligible to receive COBRA continuation coverage; and (iii) the date on which the Executive becomes eligible to receive substantially similar coverage from another employer or other source. Notwithstanding the foregoing, if the Company's making payments under this Section 5.2.2 would violate the nondiscrimination rules applicable to non-grandfathered plans under the Affordable Care Act (the "ACA"), or result in the imposition of penalties under the ACA and the related regulations and guidance promulgated thereunder), the parties agree to reform this Section 5.2.2 in a manner as is necessary to comply with the ACA. Executive shall provide the Company with notice of subsequent employment and comparable coverage within thirty (30) days of commencement of such comparable coverage.

5.3 Following a Change in Control, by the Company Without Cause or by Executive for Good Reason. If within three (3) month prior to or twelve (12) months following the occurrence of a Change in Control, as defined herein, either the Company terminates Executive's employment and this Agreement pursuant to Section 4.1 (Without Cause, Upon Notice) or Executive terminates Executive's employment and this Agreement pursuant to Section 4.4 (for Good Reason), then in lieu of any benefits under Section 5.2, and subject to Executive's continue compliance with Executive's obligations under the Restrictive Covenant Agreement, the Company shall pay Executive the Accrued Obligations and, subject to Section 5.5 (Required Release), Executive shall be entitled to the following:

5.3.1 The Company shall pay Executive an amount equal to twelve (12) months of Executive's then current monthly base salary (less applicable taxes and withholdings) (the "CIC Severance Period") plus 1 times Executive's target bonus for the year during which the Separation Date occurs, payable in lump sum Seventy-five (75) days following the Separation Date;

5.3.2 If Executive timely and properly elects health continuation coverage under COBRA, during the CIC Severance Period, the Company shall reimburse Executive for the difference between the monthly COBRA premium paid by the Executive for and the monthly premium amount paid by Executive immediately prior to the date that Executive's employment terminated. Such reimbursement shall be paid to the Executive on or before the tenth (10th) day of the month immediately following the month in which Executive timely remits the premium payment, with such reimbursements to commence in the month following the month the release under Section 5.4 becomes effective and non-revocable. Executive shall be eligible to receive such reimbursement until the earliest of: (i) the twelfth-month anniversary of the Separation Date; (ii) the date the Executive is no longer eligible to receive COBRA continuation coverage; and (iii) the date on which the Executive becomes eligible to receive substantially similar

coverage from another employer or other source. Notwithstanding the foregoing, if the Company's making payments under this Section 5.3.2 would violate the nondiscrimination rules applicable to non-grandfathered plans under the ACA, or result in the imposition of penalties under the ACA and the related regulations and guidance promulgated thereunder), the parties agree to reform this Section 5.3.2 in a manner as is necessary to comply with the ACA. Executive shall provide the Company with notice of subsequent employment and comparable coverage within thirty (30) days of commencement of such comparable coverage; and

5.3.3 All unvested time-based equity grants shall vest in full as of the Separation Date, provided that such equity shall remain subject to the other terms and conditions of the applicable Company incentive award plan(s) and individual award agreement(s).

5.4 Definition of Change in Control.

5.4.1 "Change in Control" means and includes each of the following:

(a) A transaction or series of transactions (other than an offering of Common Stock to the general public through a registration statement filed with the Securities and Exchange Commission or a transaction or series of transactions that meets the requirements of clauses (i) and (ii) of subsection (c) below) whereby any "person" or related "group" of "persons" (as such terms are used in Sections 13(d) and 14(d)(2) of the Securities Exchange Act of 1934, as amended (the "Exchange Act")) (other than the Company, any of its Subsidiaries, an employee benefit plan maintained by the Company or any of its Subsidiaries or a "person" that, prior to such transaction, directly or indirectly controls, is controlled by, or is under common control with, the Company) directly or indirectly acquires beneficial ownership (within the meaning of Rule 13d-3 under the Exchange Act) of securities of the Company possessing more than 50% of the total combined voting power of the Company's securities outstanding immediately after such acquisition; provided, however, that for purposes of this Agreement, "Subsidiary" means any entity (other than the Company), whether domestic or foreign, in an unbroken chain of entities beginning with the Company if each of the entities other than the last entity in the unbroken chain beneficially owns, at the time of the determination, securities or interests representing at least 50% of the total combined voting power of all classes of securities or interests in one of the other entities in such chain; or

(b) During any period of two consecutive years, individuals who, at the beginning of such period, constitute the Board of Directors (the "Board") together with any new director(s) of the Board (other than a director designated by a person who shall have entered into an agreement with the Company to effect a transaction described in subsections (a) or (c)) whose election by the Board or nomination for election by the Company's stockholders was approved by a vote of at least two-thirds of the directors then still in office who either were directors at the beginning of the two-year period or whose election or nomination for election was previously so approved, cease for any reason to constitute a majority thereof; or

(c) The consummation by the Company (whether directly involving the Company or indirectly involving the Company through one or more intermediaries) of (x) a merger, consolidation, reorganization, or business combination or (y) a sale or other disposition of all or substantially all of the Company's assets in any single transaction or series of related transactions or (z) the acquisition of assets or stock of another entity, in each case other than a transaction:

(i) which results in the Company's voting securities outstanding immediately before the transaction continuing to represent (either by remaining outstanding or by being converted into voting securities of the Company or the person that, as a result of the transaction, controls, directly or indirectly, the Company or owns, directly or indirectly, all or substantially all of the Company's assets or otherwise succeeds to the business of the Company (the Company or such person, the "Successor Entity")) directly or indirectly, at least a majority of the combined voting power of the Successor Entity's outstanding voting securities immediately after the transaction, and

(ii) after which no person or group beneficially owns voting securities representing 50% or more of the combined voting power of the Successor Entity; provided, however, that no person or group shall be treated for purposes of this clause (ii) as beneficially owning 50% or more of the combined voting power of the Successor Entity solely as a result of the voting power held in the Company prior to the consummation of the transaction.

5.4.2 Notwithstanding the foregoing, (i) a Change in Control shall not include an IPO (referenced in Background, Section B of this Agreement); and (ii) if a Change in Control constitutes a payment event under this Agreement that provides for the deferral of compensation that is subject to Section 409A of the Internal Revenue Code of 1986, as amended (the "Code"), and the regulations thereunder (collectively, "Section 409A"), to the extent required to avoid the imposition of additional taxes under Section 409A, the transaction or event described in subsection (a), (b) or (c) with respect to such payment (or portion thereof) shall only constitute a Change in Control for purposes of the payment timing if such transaction also constitutes a "change in control event," as defined in Treasury Regulation Section 1.409A-3(i)(5).

5.4.3 The Company shall have full and final authority, which shall be exercised in its discretion, to determine conclusively whether a Change in Control has occurred pursuant to the above definition, the date of the occurrence of such Change in Control and any incidental matters relating thereto; provided that any exercise of authority in conjunction with a determination of whether a Change in Control is a "change in control event" as defined in Treasury Regulation Section 1.409A-3(i)(5) shall be consistent with such regulation.

5.5 Required Release. Notwithstanding any provision of this Agreement to the contrary, the Company's obligation to provide the payments and reimbursements under Sections 5.2.1, 5.2.2, 5.3.1 and 5.3.2 is conditioned upon Executive's execution of a standard form of an enforceable release of claims and Executive's compliance with the Restrictive Covenant Agreement. If Executive chooses not to execute such a release or fails to comply with the Restrictive Covenant Agreement, then the Company's obligation to compensate Executive ceases on the Separation Date except as to amounts due at the time. The release of claims shall be provided to Executive within ten (10) days of Executive's separation from service and Executive must execute it within the time period specified in the release (which shall not be longer than forty-five (45) days from the date of receipt). Such release shall not be effective until any applicable revocation period has expired.

5.6 Benefits in Lieu of Other Severance. Executive is not entitled to receive any compensation or benefits upon Executive's termination except as: (i) set forth in this Agreement; (ii) otherwise required by law; or (iii) otherwise required by any employee benefit plan in which Executive participates. Moreover, the terms and conditions afforded Executive under this Agreement are in lieu of any severance benefits to which Executive otherwise might be entitled pursuant to any severance plan, policy and practice of the Company.

6. RESTRICTIVE COVENANTS. Executive shall continue to be obligated under the Proprietary Information, Inventions, Non-Competition and Non-Solicitation Agreement, dated May 17, 2017 (the "Restrictive Covenant Agreement"). Executive agrees to abide by the terms of the Restrictive Covenant Agreement, or any other subsequent agreement with the Company relating to proprietary information, inventions, intellectual property, non-competition or non-solicitation, the terms of which are hereby incorporated by reference into this Agreement. Executive acknowledges that the provisions of the Restrictive Covenant Agreement, or any subsequent similar agreement, will survive the termination of Executive's employment and/or the termination of this Agreement.

7. COMPANY PROPERTY. Upon the termination of Executive's employment or upon Company's earlier request, Executive shall: (i) deliver to the Company all records, memoranda, data, documents and other property of any description which refer or relate in any way to trade secrets or confidential information, including all copies thereof, which are in Executive's possession, custody or control; (ii) deliver to the Company all Company property (including, but not limited to, keys, credit cards, customer files, contracts, proposals, work in process, manuals, forms, computer-stored work in process and other computer data, research materials, other items of business information concerning any Company customer, or Company business or business methods, including all copies thereof) which is in Executive's possession, custody or control; (iii) bring all such records, files and other materials up to date before returning them; and (iv) fully cooperate with the Company in winding up Executive's work and transferring that work to other individuals designated by the Company.

8. EMPLOYEE REPRESENTATION. Executive represents and warrants that Executive's employment and obligations under this Agreement will not (i) breach any duty or obligation Executive owes to another or (ii) violate any law, recognized ethics standard or recognized business custom.

9. AMENDMENTS; WAIVERS. This Agreement may not be modified, amended, or terminated except by an instrument in writing, signed by Executive and a duly authorized officer of Company. By an instrument in writing similarly executed, Executive or a duly authorized officer of the Company may waive compliance by the other Party with any specifically identified provision of this Agreement that such other Party was or is obligated to comply with or perform; *provided*, *however*, that such waiver shall not operate as a waiver of, or estoppel with respect to, any other or subsequent failure. No failure to exercise and no delay in exercising any right, remedy, or power hereunder will preclude any other or further exercise of any other right, remedy, or power provided herein or by law or in equity.

10. ENTIRE AGREEMENT. Except as expressly provided in this Agreement, this Agreement: (i) supersedes and cancels all other understandings and agreements, oral or written, with respect to Executive's employment with the Company; (ii) supersedes all other understandings and agreements, oral or written, between the parties with respect to the subject matter of this Agreement; and (iii) constitutes the sole agreement between the parties with respect to this subject matter. Each party acknowledges that: (i) no representations, inducements, promises or agreements, oral or written, have been made by any party or by anyone acting on behalf of any party, which are not embodied in this Agreement; and (ii) no agreement, statement or promise not contained in this Agreement shall be valid. No change or modification of this Agreement shall be valid or binding upon the parties unless such change or modification is in writing and is signed by the parties.

11. SEVERABILITY. If a court of competent jurisdiction holds that any provision or sub-part thereof contained in this Agreement is invalid, illegal, or unenforceable, that invalidity, illegality, or unenforceability shall not affect any other provision in this Agreement.

12. ASSIGNMENT AND SUCCESSORS. The Company may assign its rights and obligations under this Agreement to any of its affiliates or to any successor to all or substantially all of the business or the assets of the Company (by merger or otherwise), and may assign or encumber this Agreement and its rights hereunder as security for indebtedness of the Company and its affiliates. This Agreement shall be binding upon and inure to the benefit of the Company, Executive and their respective successors, assigns, personnel and legal representatives, executors, administrators, heirs, distributees, devisees, and legatees, as applicable. None of Executive's rights or obligations may be assigned or transferred by Executive, other than Executive's rights to payments hereunder, which may be transferred only by will or operation of law.

13. GOVERNING LAW. This Agreement shall be construed, interpreted, and governed in accordance with and by North Carolina law and the applicable provisions of federal law ("Applicable Federal Law"). Any and all claims, controversies, and causes of action arising out of or relating to this Agreement, whether sounding in contract, tort, or statute, shall be governed by the laws of the state of North Carolina, including its statutes of limitations, except for Applicable Federal Law, without giving effect to any North Carolina conflict-of-laws rule that would result in the application of the laws of a different jurisdiction. Both Executive and the Company acknowledge and agree that the state or federal courts located in North Carolina have personal jurisdiction over them and over any dispute arising under this Agreement, and both Executive and the Company irrevocably consent to the jurisdiction of such courts.

14. COUNTERPARTS. This Agreement may be executed in counterparts, each of which shall be an original, with the same effect as if the signatures affixed thereto were upon the same instrument.

15. NOTICES. Any notice, request, claim, demand, document and other communication hereunder to any Party shall be effective upon receipt (or refusal of receipt) and shall be in writing and delivered personally or sent by facsimile or certified or registered mail, postage prepaid, as follows:

15.1 If to the Company, to the Chief Executive Officer of the Company at the Company's headquarters,

15.2 If to Executive, to the last address that the Company has in its personnel records for Executive, or

15.3 At any other address as any Party shall have specified by notice in writing to the other Party.

16. SECTION 409A OF THE INTERNAL REVENUE CODE. The parties intend that the provisions of this Agreement comply with Section 409A of the Code and all provisions of this Agreement shall be construed in a manner consistent with the requirements for avoiding taxes or penalties under Section 409A. If any provision of this Agreement (or of any award of compensation, including equity compensation or benefits) would cause Executive to incur any additional tax or interest under Section 409A, the Company shall, upon the specific request of Executive, use its reasonable business efforts to in good faith reform such provision to comply with Code Section 409A; provided, that to the maximum extent practicable, the original intent and economic benefit to Executive and the Company of the applicable provision shall be maintained, and the Company shall have no obligation to make any changes that could create any additional economic cost or loss of benefit to the Company. The Company shall timely use its reasonable business efforts to amend any plans and programs in which Executive participates to bring it in compliance with Section 409A. Notwithstanding the foregoing, the Company shall have no liability with regard to any failure to comply with Section 409A so long as it has acted in good faith with regard to compliance therewith.

16.1 Separation from Service. A termination of employment shall not be deemed to have occurred for purposes of any provision of this Agreement providing for the payment of any amounts or benefits upon or following a termination of employment unless such termination also constitutes a "Separation from Service" within the meaning of Section 409A and, for purposes of any such provision of this Agreement, references to a "termination," "termination of employment," "separation from service" or like terms shall mean Separation from Service.

16.2 Separate Payments. Each installment payment required under this Agreement shall be considered a separate payment for purposes of Section 409A.

16.3 Delayed Distribution to Specified Employee. If the Company determines in accordance with Sections 409A and 416(i) of the Code and the regulations promulgated thereunder, in the Company's sole discretion, that Executive is a Specified Employee of the Company on the date Executive's employment with the Company terminates and that a delay in benefits provided under this Agreement is necessary to comply with Code Section 409A(A)(2)(B)(i), then any severance payments and any continuation of benefits or reimbursement of benefit costs provided by this Agreement, and not otherwise exempt from Section 409A, shall be delayed for a period of six (6) months following the date of termination of Executive's employment (the "409A Delay Period"). In such event, any severance payments and the cost of any continuation of benefits provided under this Agreement that would otherwise be due and payable to Executive during the 409A Delay Period shall be paid to Executive in a lump sum cash amount in the month following the end of the 409A Delay Period. For purposes of this Agreement, "Specified Employee" shall mean an employee who, on an Identification Date ("Identification Date" shall mean each December 31) is a specified employee as defined in Section 416(i) of the Code without regard to paragraph (5) thereof. If Executive is identified as a Specified Employee on an Identification Date, then Executive shall be considered a Specified Employee for purposes of this Agreement during the period beginning on the first April 1 following the Identification Date and ending on the following March 31.

16.4 Reimbursements. To the extent required by Section 409A, each reimbursement or in-kind benefit provided under this Agreement shall be provided in accordance with the following: (a) the amount of expenses eligible for reimbursement, or in-kind benefits provided, during each calendar year cannot affect the expenses eligible for reimbursement, or in-kind benefits to be provided, in any other calendar year; (b) any reimbursement of an eligible expense shall be paid to Executive on or before the last day of the calendar year following the calendar year in which the expense was incurred; and (c) any right to reimbursements or in-kind benefits under this Agreement shall not be subject to liquidation or exchange for another benefit.

17. PARACHUTE PAYMENTS. Notwithstanding any other provisions of this Agreement or any Company equity plan or agreement, in the event that any payment or benefit by the Company or otherwise to or for the benefit of Executive, whether paid or payable or distributed or distributable pursuant to the terms of this Agreement or otherwise (all such payments and benefits, including the payments and benefits under Section 5 hereof, being hereinafter referred to as the "Total Payments"), would be subject (in whole or in part) to the excise tax imposed by Section 4999 of the Code (the "Excise Tax"), then the Total Payments shall be reduced (in the order provided in Section 16.1) to the minimum extent necessary to avoid the imposition of the Excise Tax on the Total Payments, but only if (i) the net amount of such Total Payments, as so reduced (and after subtracting the net amount of federal, state and local income and employment taxes on such reduced Total Payments and after taking into account the phase out of itemized deductions and personal exemptions attributable to such reduced Total Payments), is greater than or equal to (ii) the net amount of such Total Payments without such reduction (but after subtracting the net amount of federal, state and local income and employment taxes on such Total Payments and the amount of the Excise Tax to which Executive would be subject in respect of such unreduced Total Payments and after taking into account the phase out of itemized deductions and personal exemptions attributable to such unreduced Total Payments).

17.1 Order of Reduction. The Total Payments shall be reduced in the following order: (i) reduction on a pro-rata basis of any cash severance payments that are exempt from Section 409A of the Code, (ii) reduction on a pro-rata basis of any non-cash severance payments or benefits that are exempt from Section 409A, (iii) reduction on a pro-rata basis of any other payments or benefits that are exempt from Section 409A, and (iv) reduction of any payments or benefits otherwise payable to Executive on a pro-rata basis or such other manner that complies with Section 409A; provided, in case of clauses (ii), (iii) and (iv), that reduction of any payments attributable to the acceleration of vesting of Company equity awards shall be first applied to Company equity awards that would otherwise vest last in time.

17.2 Determinations. All determinations regarding the application of this Section 17 shall be made by an accounting firm or consulting group with experience in performing calculations regarding the applicability of Section 280G of the Code and the Excise Tax selected by the Company (the "Independent Advisors"). For purposes of determinations, no portion of the Total Payments shall be taken into account which, in the opinion of the Independent Advisors, (i) does not constitute a "parachute payment" within the meaning of Section 280G(b)(2) of the Code

(including by reason of Section 280G(b)(4)(A) of the Code) or (ii) constitutes reasonable compensation for services actually rendered, within the meaning of Section 280G(b)(4)(B) of the Code, in excess of the "base amount" (as defined in Section 280G(b)(3) of the Code) allocable to such reasonable compensation. The costs of obtaining such determination and all related fees and expenses (including related fees and expenses incurred in any later audit) shall be borne by the Company.

17.3 Additional Reductions. In the event it is later determined that a greater reduction in the Total Payments should have been made to implement the objective and intent of this Section 17, the excess amount shall be returned promptly by Executive to the Company.

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IN WITNESS WHEREOF, the parties have entered into this Agreement on the day and year first written above.

DEREK JANTZ

/s/ Derek Jantz

PRECISION BIOSCIENCES, INC.

By: /s/ Matthew Kane

Title: Chief Executive Officer

EXECUTIVE EMPLOYMENT AGREEMENT

This Executive Employment Agreement (the "Agreement") is made and entered into as of this 27th day of February, 2019 (the "Effective Date"), by and between Precision BioSciences, Inc. (the "Company"), and Abid Ansari ("Executive"). The Company and Executive are sometimes referred to in this Agreement individually as a "Party" and collectively as the "Parties."

BACKGROUND

A. Executive has been employed by the Company and subject to the terms of an Offer Letter, June 12, 2016 (the "Offer Letter"), the terms of which are currently in effect. Executive and the Company wish to formalize the terms and conditions of Executive's employment in this Agreement.

B. Both Executive and the Company wish to continue the employment relationship on the terms set forth in this Agreement, which provide Executive with greater benefits than those to which Executive is currently entitled, some of which will be conditioned upon the Company's consummation of its initial public offering (the "IPO"), which offering will be effective with the filing of an effective registration statement under the Securities Act of 1933, as amended (the "Effective Date of the IPO"). This Agreement is intended to replace and supersede the Offer Letter as of the Effective Date of this Agreement.

NOW, THEREFORE, in consideration of the foregoing, of the mutual promises herein, and of other good and valuable consideration, including the continued employment of the Executive by the Company and the compensation to be received by the Executive from the Company from time to time, and specifically the compensation to be received by the Executive pursuant to Section 4 hereof, the receipt and sufficiency of which are hereby acknowledged, the parties hereto, intending legally to be bound, hereby agree as follows:

1. EMPLOYMENT. As of the Effective Date, the Company hereby continues to employ the Executive and Executive hereby accepts employment as the Chief Financial Officer of the Company upon the terms and conditions of this Agreement. As of the Effective Date, the parties agree that the Offer Letter shall be of no further force or effect.

2. NATURE OF EMPLOYMENT/DUTIES. Executive shall serve as the Chief Financial Officer of the Company and shall have such responsibilities and authority as the Company may designate from time to time consistent with Executive's title and position.

2.1 Executive shall perform all duties and exercise all authority in accordance with, and otherwise comply with, all Company policies, procedures, practices and directions.

2.2 Executive shall devote substantially all working time, best efforts, knowledge and experience to perform successfully Executive's duties and advance the Company's interests. During Executive's employment, Executive may, with the Board's consent (which shall not be unreasonably withheld), engage in other business activities for compensation (including board memberships), provided that, such activities do not present a conflict of interest nor violate the Restrictive Covenant Agreement (defined in Section 6), nor otherwise prohibit Executive from fulfilling Executive's obligations hereunder.

3. COMPENSATION.

3.1 Base Salary. Executive's initial annual base salary for all services rendered shall be Two Hundred Fifty Thousand and 00/100 Dollars ($250,000) (less applicable taxes and withholdings) payable in accordance with the Company's payroll practices as they may exist from time to time (such salary, as adjusted in accordance with this Section 3.1, referred to herein as "Base Salary"). Effective as of the Effective Date of the IPO, Executive's Base Salary shall be raised to Three Hundred Sixteen Thousand and 00/100 Dollars ($316,000) (less applicable taxes and withholdings). Base Salary may be reviewed and adjusted by the Company, at its discretion, in accordance with the Company's policies, procedures, and practices as they may exist from time to time, provided that the Base Salary shall not be decreased unless the decrease is an across-the-board decrease for all senior management employees of the Company.

3.2 Business Expenses. Executive shall be reimbursed for reasonable and necessary expenses actually incurred by Executive in performing services under this Agreement in accordance with and subject to the terms and conditions of the applicable Company reimbursement policies, procedures, and practices as they may exist from time to time. All such reimbursements shall be made no later than the end of the calendar year following the year in which the expense was incurred.

3.3 Bonus. Executive may participate in any Company bonus plan the Company may adopt for senior management subject to the terms, conditions, and any eligibility requirements that may exist in such plan or plans. Effective as of the Effective Date of the IPO, Executive's annual incentive compensation under such bonus plan (the "Annual Bonus") shall be targeted at 35% of Executive's Base Salary (such target, as may be increased by the Board from time to time, the "Target Annual Bonus"). The Annual Bonus payable under the bonus plan shall be based on the achievement of performance goals to be determined by the Board. The payment of any Annual Bonus pursuant to the bonus plan shall be subject to Executive's continued employment with the Company through the date of payment.

3.4 Equity. Executive shall be eligible to participate in any equity compensation plan or similar program adopted by the Company when approved by the Board and, if applicable, the Company's shareholders, for executives at Executive's level. The amount awarded, if any, to the Executive under any such plan shall be in the discretion of the Board or any committee administering such plan and shall be subject to the terms and conditions of any plan or program adopted or approved by the Board.

3.5 Benefits. Executive may participate in all medical, dental and disability insurance, 401(k), personal leave and other employee benefit plans and programs of the Company for which Executive is eligible, provided, however, that Executive's participation in benefit plans and programs is subject to the applicable terms, conditions and eligibility requirements of these plans and programs, some of which are within the plan administrator's discretion, as they may exist from time to time. The Company shall pay annual dues and expenses for Executive's membership and participation in such professional organizations as may be approved by the Board.

4. TERM OF EMPLOYMENT AND TERMINATION. The Company and Executive acknowledge that Executive's employment is and shall continue to be at-will, as defined under applicable law, and that Executive's employment with the Company may be terminated by either Party at any time for any or no reason (subject to the notice requirements of this Section 4). This "at-will" nature of Executive's employment shall remain unchanged during Executive's tenure as an employee and may not be changed, except in an express writing signed by Executive and a duly authorized officer of the Company. The term of this Agreement and Executive's employment hereunder shall commence on the Effective Date and continue until terminated as set forth in this Section 4. The date on which Executive's employment terminates, as determined by the Company, regardless of the reason, shall be referred to herein as the "Separation Date." Upon termination of Executive's employment for any reason, Executive shall be deemed to have resigned from all offices and directorships, if any, then held with the Company or any of its subsidiaries.

4.1 Without Cause, Upon Notice. Either the Company or Executive may terminate Executive's employment and this Agreement without Cause at any time upon giving the other party thirty (30) days written notice.

4.2 For Cause. The Company may terminate Executive's employment and this Agreement immediately without notice at any time for "Cause," which shall mean the following:

4.2.1 Executive's material failure to perform Executive's duties or to carryout the reasonable and lawful instructions of the Chief Executive Officer or the Board of Directors (other than any such failure resulting from incapacity due to physical or mental illness);

4.2.2 Executive's engagement in dishonesty, illegal conduct, or gross misconduct, which is, in each case, materially injurious to the Company or its affiliates;

4.2.3 Executive's embezzlement, misappropriation, or fraud, whether or not related to the Executive's employment with the Company;

4.2.4 Executive's conviction of or plea of guilty or nolo contendere to a crime that constitutes a felony (or state law equivalent) or a crime that constitutes a misdemeanor involving moral turpitude;

4.2.5 Executive's failure to cooperate with the Company in any investigation or formal proceeding;

4.2.6 Executive's material breach of any material obligation under this Agreement, the Restrictive Covenant Agreement (as defined in Section 6), or any other written agreement between the Executive and the Company; or

4.2.7 any material failure by Executive to comply with the Company's written policies or rules, as they may be in effect from time to time.

Provided, however, that prior to termination based on Sections 4.2.1, 4.2.7 or 4.2.8, Executive shall be given written notice of the facts allegedly constituting Cause and a ten (10) day opportunity to cure.

4.3 By Death or Disability. Executive's employment and this Agreement shall terminate upon Executive's Disability or death. For purposes of this Agreement, "Disability" shall mean Executive's inability, due to physical or mental incapacity, to perform the essential functions of Executive's job, with or without reasonable accommodation, for one hundred eighty (180) days out of any three hundred sixty-five (365) day period; provided however, in the event that the Company temporarily replaces the Executive, or transfers the Executive's duties or responsibilities to another individual on account of the Executive's inability to perform such duties due to a mental or physical incapacity which is, or is reasonably expected to become, a Disability, then the Executive's employment shall not be deemed terminated by the Company. Any question as to the existence of the Executive's Disability as to which the Executive and the Company cannot agree shall be determined in writing by a qualified independent physician mutually acceptable to the Executive and the Company. If the Executive and the Company cannot agree as to a qualified independent physician, each shall appoint such a physician and those two physicians shall select a third who shall make such determination in writing. The determination of Disability made in writing to the Company and the Executive shall be final and conclusive for all purposes of this Agreement. The Company shall give Executive written notice of termination for Disability and the termination shall be effective as of the date specified in such notice.

4.4 For Good Reason. Executive may terminate Executive's employment for "Good Reason," which shall mean the occurrence of any of the following, in each case without the Executive's written consent:

4.4.1 a material reduction in Executive's Base Salary other than a general reduction in Base Salary that affects all similarly situated executives;

4.4.2 an involuntary relocation of the Executive's principal place of employment by more than thirty five (35) miles; or

4.4.3 the Company's failure to obtain an agreement from any successor to the Company to assume and agree to perform this Agreement in the same manner and to the same extent that the Company would be required to perform if no succession had taken place, except where such assumption occurs by operation of law.

Executive cannot terminate Executive's employment for Good Reason unless Executive has provided written notice to the Company of the existence of the circumstances providing grounds for termination for Good Reason within thirty (30) days of the initial existence of such grounds and the Company has had at least thirty (30) days from the date on which such notice is provided to cure such circumstances. If the Executive does not terminate Executive's employment for Good Reason within sixty (60) days after the first occurrence of the applicable grounds, then the Executive will be deemed to have waived Executive's right to terminate for Good Reason with respect to such grounds.

5. COMPENSATION AND BENEFITS UPON TERMINATION. If Executive's employment terminates for any reason, Executive shall not be entitled to any payments, benefits, damages, award or compensation other than as provided in this Agreement or otherwise agreed to in writing by the Company or as provided by applicable law. Upon termination of Executive's employment pursuant to any of the circumstances listed in Section 4, Executive (or Executive's estate) shall be entitled to receive the sum of: (i) the portion of Executive's Base Salary earned through the Separation Date, but not yet paid to Executive; (ii) any expense reimbursements owed to Executive pursuant to Section 3.2; and (iii) any amount accrued and arising from Executive's participation in, or benefits accrued under any employee benefit plans, programs or arrangements, which amounts shall be payable in accordance with the terms and conditions of such employee benefit plans, programs or arrangements (collectively, the "Accrued Obligations"). Except as otherwise expressly required by law (e.g., COBRA) or as specifically provided herein, all of Executive's rights to salary, severance, benefits, bonuses and other compensatory amounts hereunder (if any) shall cease upon the termination of Executive's employment hereunder. In the event that Executive's employment is terminated by the Company for any reason, Executive's sole and exclusive remedy shall be to receive the payments and benefits described in this Section 5.

5.1 By the Company for Cause or because of Executive's Death or Disability, or by Executive Without Cause, Upon Notice. If Executive's employment and this Agreement are terminated by the Company for Cause or because of Executive's death or Disability, or by Executive pursuant to Section 4.1 (Without Cause, Upon Notice), then the Company's obligation to compensate Executive ceases on the Separation Date except for the Accrued Obligations.

5.2 By the Company Without Cause or by Executive for Good Reason. If the Company terminates Executive's employment and this Agreement pursuant to Section 4.1 (Without Cause, Upon Notice) or Executive terminates Executive's employment and this Agreement pursuant to Section 4.4 (for Good Reason), subject to Executive's continued compliance with Executive's obligations under the Restrictive Covenant Agreement then the Company shall pay Executive the Accrued Obligations and subject to Section 5.5 (Required Release), Executive shall be entitled to the following:

5.2.1 pay Executive an amount equal to nine (9) months of Executive's then current monthly base salary (less applicable taxes and withholdings (the "Severance Period"), payable in substantially equal monthly installments on the same payroll schedule applicable to Executive immediately prior to Executive's separation from service and commencing on the first such payroll date on or following the date on which the release of claims required by Section 5.5 becomes effective and non-revocable, but not later than ninety (90) days following termination from employment; provided however that if the 90th day following Executive's termination from employment occurs in the year following the year in which Executive's termination occurs, then the payments shall commence no earlier than January 1 of such subsequent year and provided further that if such payments commence in such subsequent year, the first such payment shall be a lump sum in an amount equal to the payments that would have come due since Executive's separation from service, and

5.2.2 If Executive timely and properly elects health continuation coverage under the Consolidated Omnibus Budget Reconciliation Act of 1985 ("COBRA"), during the Severance Period, the Company shall reimburse Executive for the difference between the monthly COBRA premium paid by the Executive for and the monthly premium amount paid by Executive immediately prior to the date that Executive's employment terminated. Such reimbursement shall be paid to the Executive on or before the tenth (10th) day of the month immediately following the month in which the Executive timely remits the premium payment, with such reimbursements to commence when the payments under Section 5.2.1 commence. Executive shall be eligible to receive such reimbursement until the earliest of: (i) the twelfth-month anniversary of the Separation Date; (ii) the date the Executive is no longer eligible to receive COBRA continuation coverage; and (iii) the date on which the Executive becomes eligible to receive substantially similar coverage from another employer or other source. Notwithstanding the foregoing, if the Company's making payments under this Section 5.2.2 would violate the nondiscrimination rules applicable to non-grandfathered plans under the Affordable Care Act (the "ACA"), or result in the imposition of penalties under the ACA and the related regulations and guidance promulgated thereunder), the parties agree to reform this Section 5.2.2 in a manner as is necessary to comply with the ACA. Executive shall provide the Company with notice of subsequent employment and comparable coverage within thirty (30) days of commencement of such comparable coverage.

5.3 Following a Change in Control, by the Company Without Cause or by Executive for Good Reason. If within three (3) month prior to or twelve (12) months following the occurrence of a Change in Control, as defined herein, either the Company terminates Executive's employment and this Agreement pursuant to Section 4.1 (Without Cause, Upon Notice) or Executive terminates Executive's employment and this Agreement pursuant to Section 4.4 (for Good Reason), then in lieu of any benefits under Section 5.2, and subject to Executive's continue compliance with Executive's obligations under the Restrictive Covenant Agreement, the Company shall pay Executive the Accrued Obligations and, subject to Section 5.5 (Required Release), Executive shall be entitled to the following:

5.3.1 The Company shall pay Executive an amount equal to twelve (12) months of Executive's then current monthly base salary (less applicable taxes and withholdings) (the "CIC Severance Period") plus 1 times Executive's target bonus for the year during which the Separation Date occurs, payable in lump sum Seventy-five (75) days following the Separation Date;

5.3.2 If Executive timely and properly elects health continuation coverage under COBRA, during the CIC Severance Period, the Company shall reimburse Executive for the difference between the monthly COBRA premium paid by the Executive for and the monthly premium amount paid by Executive immediately prior to the date that Executive's employment terminated. Such reimbursement shall be paid to the Executive on or before the tenth (10th) day of the month immediately following the month in which Executive timely remits the premium payment, with such reimbursements to commence in the month following the month the release under Section 5.4 becomes effective and non-revocable. Executive shall be eligible to receive such reimbursement until the earliest of: (i) the twelfth-month anniversary of the Separation Date; (ii) the date the Executive is no longer eligible to receive COBRA continuation coverage; and (iii) the date on which the Executive becomes eligible to receive substantially similar coverage from another employer or other source. Notwithstanding the foregoing, if the Company's making payments under this Section 5.3.2 would violate the nondiscrimination rules applicable to

non-grandfathered plans under the ACA, or result in the imposition of penalties under the ACA and the related regulations and guidance promulgated thereunder), the parties agree to reform this Section 5.3.2 in a manner as is necessary to comply with the ACA. Executive shall provide the Company with notice of subsequent employment and comparable coverage within thirty (30) days of commencement of such comparable coverage; and

5.3.3 All unvested time-based equity grants shall vest in full as of the Separation Date, provided that such equity shall remain subject to the other terms and conditions of the applicable Company incentive award plan(s) and individual award agreement(s).

5.4 Definition of Change in Control.

5.4.1 "Change in Control" means and includes each of the following:

(a) A transaction or series of transactions (other than an offering of Common Stock to the general public through a registration statement filed with the Securities and Exchange Commission or a transaction or series of transactions that meets the requirements of clauses (i) and (ii) of subsection (c) below) whereby any "person" or related "group" of "persons" (as such terms are used in Sections 13(d) and 14(d)(2) of the Securities Exchange Act of 1934, as amended (the "Exchange Act")) (other than the Company, any of its Subsidiaries, an employee benefit plan maintained by the Company or any of its Subsidiaries or a "person" that, prior to such transaction, directly or indirectly controls, is controlled by, or is under common control with, the Company) directly or indirectly acquires beneficial ownership (within the meaning of Rule 13d-3 under the Exchange Act) of securities of the Company possessing more than 50% of the total combined voting power of the Company's securities outstanding immediately after such acquisition; provided, however, that for purposes of this Agreement, "Subsidiary" means any entity (other than the Company), whether domestic or foreign, in an unbroken chain of entities beginning with the Company if each of the entities other than the last entity in the unbroken chain beneficially owns, at the time of the determination, securities or interests representing at least 50% of the total combined voting power of all classes of securities or interests in one of the other entities in such chain; or

(b) During any period of two consecutive years, individuals who, at the beginning of such period, constitute the Board of Directors (the "Board") together with any new director(s) of the Board (other than a director designated by a person who shall have entered into an agreement with the Company to effect a transaction described in subsections (a) or (c)) whose election by the Board or nomination for election by the Company's stockholders was approved by a vote of at least two-thirds of the directors then still in office who either were directors at the beginning of the two-year period or whose election or nomination for election was previously so approved, cease for any reason to constitute a majority thereof; or

(c) The consummation by the Company (whether directly involving the Company or indirectly involving the Company through one or more intermediaries) of (x) a merger, consolidation, reorganization, or business combination or (y) a sale or other disposition of all or substantially all of the Company's assets in any single transaction or series of related transactions or (z) the acquisition of assets or stock of another entity, in each case other than a transaction:

(i) which results in the Company's voting securities outstanding immediately before the transaction continuing to represent (either by remaining outstanding or by being converted into voting securities of the Company or the person that, as a result of the transaction, controls, directly or indirectly, the Company or owns, directly or indirectly, all or substantially all of the Company's assets or otherwise succeeds to the business of the Company (the Company or such person, the "Successor Entity")) directly or indirectly, at least a majority of the combined voting power of the Successor Entity's outstanding voting securities immediately after the transaction, and

(ii) after which no person or group beneficially owns voting securities representing 50% or more of the combined voting power of the Successor Entity; provided, however, that no person or group shall be treated for purposes of this clause (ii) as beneficially owning 50% or more of the combined voting power of the Successor Entity solely as a result of the voting power held in the Company prior to the consummation of the transaction.

5.4.2 Notwithstanding the foregoing, (i) a Change in Control shall not include an IPO (referenced in Background, Section B of this Agreement); and (ii) if a Change in Control constitutes a payment event under this Agreement that provides for the deferral of compensation that is subject to Section 409A of the Internal Revenue Code of 1986, as amended (the "Code"), and the regulations thereunder (collectively, "Section 409A"), to the extent required to avoid the imposition of additional taxes under Section 409A, the transaction or event described in subsection (a), (b) or (c) with respect to such payment (or portion thereof) shall only constitute a Change in Control for purposes of the payment timing if such transaction also constitutes a "change in control event," as defined in Treasury Regulation Section 1.409A-3(i)(5).

5.4.3 The Company shall have full and final authority, which shall be exercised in its discretion, to determine conclusively whether a Change in Control has occurred pursuant to the above definition, the date of the occurrence of such Change in Control and any incidental matters relating thereto; provided that any exercise of authority in conjunction with a determination of whether a Change in Control is a "change in control event" as defined in Treasury Regulation Section 1.409A-3(i)(5) shall be consistent with such regulation.

5.5 Required Release. Notwithstanding any provision of this Agreement to the contrary, the Company's obligation to provide the payments and reimbursements under Sections 5.2.1, 5.2.2, 5.3.1 and 5.3.2 is conditioned upon Executive's execution of a standard form of an enforceable release of claims and Executive's compliance with the Restrictive Covenant Agreement. If Executive chooses not to execute such a release or fails to comply with the Restrictive Covenant Agreement, then the Company's obligation to compensate Executive ceases on the Separation Date except as to amounts due at the time. The release of claims shall be provided to Executive within ten (10) days of Executive's separation from service and Executive must execute it within the time period specified in the release (which shall not be longer than forty-five (45) days from the date of receipt). Such release shall not be effective until any applicable revocation period has expired.

5.6 Benefits in Lieu of Other Severance. Executive is not entitled to receive any compensation or benefits upon Executive's termination except as: (i) set forth in this Agreement; (ii) otherwise required by law; or (iii) otherwise required by any employee benefit plan in which Executive participates. Moreover, the terms and conditions afforded Executive under this Agreement are in lieu of any severance benefits to which Executive otherwise might be entitled pursuant to any severance plan, policy and practice of the Company.

6. RESTRICTIVE COVENANTS. Executive shall continue to be obligated under the Proprietary Information, Inventions, Non-Competition and Non-Solicitation Agreement, dated May 17, 2017 (the "Restrictive Covenant Agreement"). Executive agrees to abide by the terms of the Restrictive Covenant Agreement, or any other subsequent agreement with the Company relating to proprietary information, inventions, intellectual property, non-competition or non-solicitation, the terms of which are hereby incorporated by reference into this Agreement. Executive acknowledges that the provisions of the Restrictive Covenant Agreement, or any subsequent similar agreement, will survive the termination of Executive's employment and/or the termination of this Agreement.

7. COMPANY PROPERTY. Upon the termination of Executive's employment or upon Company's earlier request, Executive shall: (i) deliver to the Company all records, memoranda, data, documents and other property of any description which refer or relate in any way to trade secrets or confidential information, including all copies thereof, which are in Executive's possession, custody or control; (ii) deliver to the Company all Company property (including, but not limited to, keys, credit cards, customer files, contracts, proposals, work in process, manuals, forms, computer-stored work in process and other computer data, research materials, other items of business information concerning any Company customer, or Company business or business methods, including all copies thereof) which is in Executive's possession, custody or control; (iii) bring all such records, files and other materials up to date before returning them; and (iv) fully cooperate with the Company in winding up Executive's work and transferring that work to other individuals designated by the Company.

8. EMPLOYEE REPRESENTATION. Executive represents and warrants that Executive's employment and obligations under this Agreement will not (i) breach any duty or obligation Executive owes to another or (ii) violate any law, recognized ethics standard or recognized business custom.

9. AMENDMENTS; WAIVERS. This Agreement may not be modified, amended, or terminated except by an instrument in writing, signed by Executive and a duly authorized officer of Company. By an instrument in writing similarly executed, Executive or a duly authorized officer of the Company may waive compliance by the other Party with any specifically identified provision of this Agreement that such other Party was or is obligated to comply with or perform; *provided*, *however*, that such waiver shall not operate as a waiver of, or estoppel with respect to, any other or subsequent failure. No failure to exercise and no delay in exercising any right, remedy, or power hereunder will preclude any other or further exercise of any other right, remedy, or power provided herein or by law or in equity.

10. ENTIRE AGREEMENT. Except as expressly provided in this Agreement, this Agreement: (i) supersedes and cancels all other understandings and agreements, oral or written, with respect to Executive's employment with the Company; (ii) supersedes all other understandings and agreements, oral or written, between the parties with respect to the subject matter of this Agreement; and (iii) constitutes the sole agreement between the parties with respect to this subject matter. Each party acknowledges that: (i) no representations, inducements, promises or agreements, oral or written, have been made by any party or by anyone acting on behalf of any party, which are not embodied in this Agreement; and (ii) no agreement, statement or promise not contained in this Agreement shall be valid. No change or modification of this Agreement shall be valid or binding upon the parties unless such change or modification is in writing and is signed by the parties.

11. SEVERABILITY. If a court of competent jurisdiction holds that any provision or sub-part thereof contained in this Agreement is invalid, illegal, or unenforceable, that invalidity, illegality, or unenforceability shall not affect any other provision in this Agreement.

12. ASSIGNMENT AND SUCCESSORS. The Company may assign its rights and obligations under this Agreement to any of its affiliates or to any successor to all or substantially all of the business or the assets of the Company (by merger or otherwise), and may assign or encumber this Agreement and its rights hereunder as security for indebtedness of the Company and its affiliates. This Agreement shall be binding upon and inure to the benefit of the Company, Executive and their respective successors, assigns, personnel and legal representatives, executors, administrators, heirs, distributees, devisees, and legatees, as applicable. None of Executive's rights or obligations may be assigned or transferred by Executive, other than Executive's rights to payments hereunder, which may be transferred only by will or operation of law.

13. GOVERNING LAW. This Agreement shall be construed, interpreted, and governed in accordance with and by North Carolina law and the applicable provisions of federal law ("Applicable Federal Law"). Any and all claims, controversies, and causes of action arising out of or relating to this Agreement, whether sounding in contract, tort, or statute, shall be governed by the laws of the state of North Carolina, including its statutes of limitations, except for Applicable Federal Law, without giving effect to any North Carolina conflict-of-laws rule that would result in the application of the laws of a different jurisdiction. Both Executive and the Company acknowledge and agree that the state or federal courts located in North Carolina have personal jurisdiction over them and over any dispute arising under this Agreement, and both Executive and the Company irrevocably consent to the jurisdiction of such courts.

14. COUNTERPARTS. This Agreement may be executed in counterparts, each of which shall be an original, with the same effect as if the signatures affixed thereto were upon the same instrument.

15. NOTICES. Any notice, request, claim, demand, document and other communication hereunder to any Party shall be effective upon receipt (or refusal of receipt) and shall be in writing and delivered personally or sent by facsimile or certified or registered mail, postage prepaid, as follows:

15.1 If to the Company, to the Chief Executive Officer of the Company at the Company's headquarters,

15.2 If to Executive, to the last address that the Company has in its personnel records for Executive, or

15.3 At any other address as any Party shall have specified by notice in writing to the other Party.

16. SECTION 409A OF THE INTERNAL REVENUE CODE. The parties intend that the provisions of this Agreement comply with Section 409A of the Code and all provisions of this Agreement shall be construed in a manner consistent with the requirements for avoiding taxes or penalties under Section 409A. If any provision of this Agreement (or of any award of compensation, including equity compensation or benefits) would cause Executive to incur any additional tax or interest under Section 409A, the Company shall, upon the specific request of Executive, use its reasonable business efforts to in good faith reform such provision to comply with Code Section 409A; provided, that to the maximum extent practicable, the original intent and economic benefit to Executive and the Company of the applicable provision shall be maintained, and the Company shall have no obligation to make any changes that could create any additional economic cost or loss of benefit to the Company. The Company shall timely use its reasonable business efforts to amend any plans and programs in which Executive participates to bring it in compliance with Section 409A. Notwithstanding the foregoing, the Company shall have no liability with regard to any failure to comply with Section 409A so long as it has acted in good faith with regard to compliance therewith.

16.1 Separation from Service. A termination of employment shall not be deemed to have occurred for purposes of any provision of this Agreement providing for the payment of any amounts or benefits upon or following a termination of employment unless such termination also constitutes a "Separation from Service" within the meaning of Section 409A and, for purposes of any such provision of this Agreement, references to a "termination," "termination of employment," "separation from service" or like terms shall mean Separation from Service.

16.2 Separate Payments. Each installment payment required under this Agreement shall be considered a separate payment for purposes of Section 409A.

16.3 Delayed Distribution to Specified Employee. If the Company determines in accordance with Sections 409A and 416(i) of the Code and the regulations promulgated thereunder, in the Company's sole discretion, that Executive is a Specified Employee of the Company on the date Executive's employment with the Company terminates and that a delay in benefits provided under this Agreement is necessary to comply with Code Section 409A(A)(2)(B)(i), then any severance payments and any continuation of benefits or reimbursement of benefit costs provided by this Agreement, and not otherwise exempt from Section 409A, shall be delayed for a period of six (6) months following the date of termination of Executive's employment (the "409A Delay Period"). In such event, any severance payments and the cost of any continuation of benefits provided under this Agreement that would otherwise be due and payable to Executive during the 409A Delay Period shall be paid to Executive in a lump sum cash amount in the month following the end of the 409A Delay Period. For purposes of this Agreement, "Specified Employee" shall mean an employee who, on an Identification Date ("Identification Date" shall mean each December 31) is a specified employee as defined in Section 416(i) of the Code without regard to paragraph (5) thereof. If Executive is identified as a Specified Employee on an Identification Date, then Executive shall be considered a Specified Employee for purposes of this Agreement during the period beginning on the first April 1 following the Identification Date and ending on the following March 31.

16.4 Reimbursements. To the extent required by Section 409A, each reimbursement or in-kind benefit provided under this Agreement shall be provided in accordance with the following: (a) the amount of expenses eligible for reimbursement, or in-kind benefits provided, during each calendar year cannot affect the expenses eligible for reimbursement, or in-kind benefits to be provided, in any other calendar year; (b) any reimbursement of an eligible expense shall be paid to Executive on or before the last day of the calendar year following the calendar year in which the expense was incurred; and (c) any right to reimbursements or in-kind benefits under this Agreement shall not be subject to liquidation or exchange for another benefit.

17. PARACHUTE PAYMENTS. Notwithstanding any other provisions of this Agreement or any Company equity plan or agreement, in the event that any payment or benefit by the Company or otherwise to or for the benefit of Executive, whether paid or payable or distributed or distributable pursuant to the terms of this Agreement or otherwise (all such payments and benefits, including the payments and benefits under Section 5 hereof, being hereinafter referred to as the "Total Payments"), would be subject (in whole or in part) to the excise tax imposed by Section 4999 of the Code (the "Excise Tax"), then the Total Payments shall be reduced (in the order provided in Section 16.1) to the minimum extent necessary to avoid the imposition of the Excise Tax on the Total Payments, but only if (i) the net amount of such Total Payments, as so reduced (and after subtracting the net amount of federal, state and local income and employment taxes on such reduced Total Payments and after taking into account the phase out of itemized deductions and personal exemptions attributable to such reduced Total Payments), is greater than or equal to (ii) the net amount of such Total Payments without such reduction (but after subtracting the net amount of federal, state and local income and employment taxes on such Total Payments and the amount of the Excise Tax to which Executive would be subject in respect of such unreduced Total Payments and after taking into account the phase out of itemized deductions and personal exemptions attributable to such unreduced Total Payments).

17.1 Order of Reduction. The Total Payments shall be reduced in the following order: (i) reduction on a pro-rata basis of any cash severance payments that are exempt from Section 409A of the Code, (ii) reduction on a pro-rata basis of any non-cash severance payments or benefits that are exempt from Section 409A, (iii) reduction on a pro-rata basis of any other payments or benefits that are exempt from Section 409A, and (iv) reduction of any payments or benefits otherwise payable to Executive on a pro-rata basis or such other manner that complies with Section 409A; provided, in case of clauses (ii), (iii) and (iv), that reduction of any payments attributable to the acceleration of vesting of Company equity awards shall be first applied to Company equity awards that would otherwise vest last in time.

17.2 Determinations. All determinations regarding the application of this Section 17 shall be made by an accounting firm or consulting group with experience in performing calculations regarding the applicability of Section 280G of the Code and the Excise Tax selected by the Company (the "Independent Advisors"). For purposes of determinations, no portion of the Total Payments shall be taken into account which, in the opinion of the Independent Advisors, (i) does not constitute a "parachute payment" within the meaning of Section 280G(b)(2) of the Code

(including by reason of Section 280G(b)(4)(A) of the Code) or (ii) constitutes reasonable compensation for services actually rendered, within the meaning of Section 280G(b)(4)(B) of the Code, in excess of the "base amount" (as defined in Section 280G(b)(3) of the Code) allocable to such reasonable compensation. The costs of obtaining such determination and all related fees and expenses (including related fees and expenses incurred in any later audit) shall be borne by the Company.

17.3 Additional Reductions. In the event it is later determined that a greater reduction in the Total Payments should have been made to implement the objective and intent of this Section 17, the excess amount shall be returned promptly by Executive to the Company.

[The remainder of this page is intentionally left blank.]

IN WITNESS WHEREOF, the parties have entered into this Agreement on the day and year first written above.

ABID ANSARI

/s/ Abid Ansari

PRECISION BIOSCIENCES, INC.

By: /s/ Matthew Kane

Title: Chief Executive Officer

Exhibit 10.15

AMENDED AND RESTATED
EXECUTIVE EMPLOYMENT AGREEMENT

This Amended and Restated Executive Employment Agreement (the "Agreement") is made and entered into as of this 27th day of February, 2019 (the "Effective Date"), by and between Precision BioSciences, Inc. (the "Company"), and David Thomson ("Executive"). The Company and Executive are sometimes referred to in this Agreement individually as a "Party" and collectively as the "Parties."

BACKGROUND

A. Executive has been employed by the Company and subject to the terms of an Employment Agreement, dated July 3, 2017 (the "Prior Agreement"), the terms of which are currently in effect. Executive and the Company wish to update the Prior Agreement, and provide for additional compensation and benefits to Executive.

B. Both Executive and the Company wish to continue the employment relationship on the updated terms set forth in this Agreement, which provide Executive with greater benefits than those under the Prior Agreement, some of which will be conditioned upon the Company's consummation of its initial public offering (the "IPO"), which offering will be effective with the filing of an effective registration statement under the Securities Act of 1933, as amended (the "Effective Date of the IPO"). This Agreement is intended to replace and supersede the Prior Agreement as of the Effective Date of this Agreement.

NOW, THEREFORE, in consideration of the foregoing, of the mutual promises herein, and of other good and valuable consideration, including the continued employment of the Executive by the Company and the compensation to be received by the Executive from the Company from time to time, and specifically the compensation to be received by the Executive pursuant to Section 4 hereof, the receipt and sufficiency of which are hereby acknowledged, the parties hereto, intending legally to be bound, hereby agree as follows:

1. EMPLOYMENT. As of the Effective Date, the Company hereby continues to employ the Executive and Executive hereby accepts employment as the Chief Development Officer of the Company upon the terms and conditions of this Agreement. As of the Effective Date, the parties agree that the Prior Agreement shall terminate.

2. NATURE OF EMPLOYMENT/DUTIES. Executive shall serve as the Chief Development Officer of the Company and shall have such responsibilities and authority as the Company may designate from time to time consistent with Executive's title and position.

2.1 Executive shall perform all duties and exercise all authority in accordance with, and otherwise comply with, all Company policies, procedures, practices and directions.

2.2 Executive shall devote substantially all working time, best efforts, knowledge and experience to perform successfully Executive's duties and advance the Company's interests. During Executive's employment, Executive may, with the Board's consent (which shall not be unreasonably withheld), engage in other business activities for compensation (including board memberships), provided that, such activities do not present a conflict of interest nor violate the Restrictive Covenant Agreement (defined in Section 6), nor otherwise prohibit Executive from fulfilling Executive's obligations hereunder.

3. COMPENSATION.

3.1 Base Salary. Executive's initial annual base salary for all services rendered shall be Three Hundred Fifty Five Thousand and 00/100 Dollars ($355,000) (less applicable taxes and withholdings) payable in accordance with the Company's payroll practices as they may exist from time to time (such salary, as adjusted in accordance with this Section 3.1, referred to herein as "Base Salary"). Effective as of the Effective Date of the IPO, Executive's Base Salary shall be raised to Three Hundred Seventy Thousand and 00/100 Dollars ($370,000) (less applicable taxes and withholdings). Base Salary may be reviewed and adjusted by the Company, at its discretion, in accordance with the Company's policies, procedures, and practices as they may exist from time to time, provided that the Base Salary shall not be decreased unless the decrease is an across-the-board decrease for all senior management employees of the Company.

3.2 Business Expenses. Executive shall be reimbursed for reasonable and necessary expenses actually incurred by Executive in performing services under this Agreement in accordance with and subject to the terms and conditions of the applicable Company reimbursement policies, procedures, and practices as they may exist from time to time. All such reimbursements shall be made no later than the end of the calendar year following the year in which the expense was incurred.

3.3 Bonus. Executive may participate in any Company bonus plan the Company may adopt for senior management subject to the terms, conditions, and any eligibility requirements that may exist in such plan or plans. Effective as of the Effective Date of the IPO, Executive's annual incentive compensation under such bonus plan (the "Annual Bonus") shall be targeted at 35% of Executive's Base Salary (such target, as may be increased by the Board from time to time, the "Target Annual Bonus"). The Annual Bonus payable under the bonus plan shall be based on the achievement of performance goals to be determined by the Board. The payment of any Annual Bonus pursuant to the bonus plan shall be subject to Executive's continued employment with the Company through the date of payment.

3.4 Equity. Executive shall be eligible to participate in any equity compensation plan or similar program adopted by the Company when approved by the Board and, if applicable, the Company's shareholders, for executives at Executive's level. The amount awarded, if any, to the Executive under any such plan shall be in the discretion of the Board or any committee administering such plan and shall be subject to the terms and conditions of any plan or program adopted or approved by the Board.

3.5 Benefits. Executive may participate in all medical, dental and disability insurance, 401(k), personal leave and other employee benefit plans and programs of the Company for which Executive is eligible, provided, however, that Executive's participation in benefit plans and programs is subject to the applicable terms, conditions and eligibility requirements of these plans and programs, some of which are within the plan administrator's discretion, as they may exist from time to time. The Company shall pay annual dues and expenses for Executive's membership and participation in such professional organizations as may be approved by the Board.

4. TERM OF EMPLOYMENT AND TERMINATION. The Company and Executive acknowledge that Executive's employment is and shall continue to be "at-will," as defined under applicable law, and that Executive's employment with the Company may be terminated by either Party at any time for any or no reason (subject to the notice requirements of this Section 4). This "at-will" nature of Executive's employment shall remain unchanged during Executive's tenure as an employee and may not be changed, except in an express writing signed by Executive and a duly authorized officer of the Company. The term of this Agreement and Executive's employment hereunder shall commence on the Effective Date and continue until terminated as set forth in this Section 4. The date on which Executive's employment terminates, as determined by the Company, regardless of the reason, shall be referred to herein as the "Separation Date." Upon termination of Executive's employment for any reason, Executive shall be deemed to have resigned from all offices and directorships, if any, then held with the Company or any of its subsidiaries.

4.1 Without Cause, Upon Notice. Either the Company or Executive may terminate Executive's employment and this Agreement without Cause at any time upon giving the other party thirty (30) days' written notice.

4.2 For Cause. The Company may terminate Executive's employment and this Agreement immediately without notice at any time for "Cause," which shall mean the following:

4.2.1 Executive's material failure to perform Executive's duties or to carryout the reasonable and lawful instructions of the Chief Executive Officer or the Board of Directors (other than any such failure resulting from incapacity due to physical or mental illness);

4.2.2 Executive's engagement in dishonesty, illegal conduct, or gross misconduct, which is, in each case, materially injurious to the Company or its affiliates;

4.2.3 Executive's embezzlement, misappropriation, or fraud, whether or not related to the Executive's employment with the Company;

4.2.4 Executive's conviction of or plea of guilty or nolo contendere to a crime that constitutes a felony (or state law equivalent) or a crime that constitutes a misdemeanor involving moral turpitude;

4.2.5 Executive's failure to cooperate with the Company in any investigation or formal proceeding;

4.2.6 Executive's material breach of any material obligation under this Agreement, the Restrictive Covenant Agreement (as defined in Section 6), or any other written agreement between the Executive and the Company; or

4.2.7 any material failure by Executive to comply with the Company's written policies or rules, as they may be in effect from time to time.

Provided, however, that prior to termination based on Sections 4.2.1, 4.2.7 or 4.2.8, Executive shall be given written notice of the facts allegedly constituting Cause and a ten (10) day opportunity to cure.

4.3 By Death or Disability. Executive's employment and this Agreement shall terminate upon Executive's Disability or death. For purposes of this Agreement, "Disability" shall mean Executive's inability, due to physical or mental incapacity, to perform the essential functions of Executive's job, with or without reasonable accommodation, for one hundred eighty (180) days out of any three hundred sixty-five (365) day period; provided however, in the event that the Company temporarily replaces the Executive, or transfers the Executive's duties or responsibilities to another individual on account of the Executive's inability to perform such duties due to a mental or physical incapacity which is, or is reasonably expected to become, a Disability, then the Executive's employment shall not be deemed terminated by the Company. Any question as to the existence of the Executive's Disability as to which the Executive and the Company cannot agree shall be determined in writing by a qualified independent physician mutually acceptable to the Executive and the Company. If the Executive and the Company cannot agree as to a qualified independent physician, each shall appoint such a physician and those two physicians shall select a third who shall make such determination in writing. The determination of Disability made in writing to the Company and the Executive shall be final and conclusive for all purposes of this Agreement. The Company shall give Executive written notice of termination for Disability and the termination shall be effective as of the date specified in such notice.

4.4 For Good Reason. Executive may terminate Executive's employment for "Good Reason," which shall mean the occurrence of any of the following, in each case without the Executive's written consent:

4.4.1 a material reduction in Executive's Base Salary other than a general reduction in Base Salary that affects all similarly situated executives;

4.4.2 an involuntary relocation of the Executive's principal place of employment by more than thirty five (35) miles; or

4.4.3 the Company's failure to obtain an agreement from any successor to the Company to assume and agree to perform this Agreement in the same manner and to the same extent that the Company would be required to perform if no succession had taken place, except where such assumption occurs by operation of law.

Executive cannot terminate Executive's employment for Good Reason unless Executive has provided written notice to the Company of the existence of the circumstances providing grounds for termination for Good Reason within thirty (30) days of the initial existence of such grounds and the Company has had at least thirty (30) days from the date on which such notice is provided to cure such circumstances. If the Executive does not terminate Executive's employment for Good Reason within sixty (60) days after the first occurrence of the applicable grounds, then the Executive will be deemed to have waived Executive's right to terminate for Good Reason with respect to such grounds.

5. COMPENSATION AND BENEFITS UPON TERMINATION. If Executive's employment terminates for any reason, Executive shall not be entitled to any payments, benefits, damages, award or compensation other than as provided in this Agreement or otherwise agreed to in writing by the Company or as provided by applicable law. Upon termination of Executive's employment pursuant to any of the circumstances listed in Section 4, Executive (or Executive's estate) shall be entitled to receive the sum of: (i) the portion of Executive's Base Salary earned through the Separation Date, but not yet paid to Executive; (ii) any expense reimbursements owed to Executive pursuant to Section 3.2; and (iii) any amount accrued and arising from Executive's participation in, or benefits accrued under any employee benefit plans, programs or arrangements, which amounts shall be payable in accordance with the terms and conditions of such employee benefit plans, programs or arrangements (collectively, the "Accrued Obligations"). Except as otherwise expressly required by law (e.g., COBRA) or as specifically provided herein, all of Executive's rights to salary, severance, benefits, bonuses and other compensatory amounts hereunder (if any) shall cease upon the termination of Executive's employment hereunder. In the event that Executive's employment is terminated by the Company for any reason, Executive's sole and exclusive remedy shall be to receive the payments and benefits described in this Section 5.

5.1 By the Company for Cause or because of Executive's Death or Disability, or by Executive Without Cause, Upon Notice. If Executive's employment and this Agreement are terminated by the Company for Cause or because of Executive's death or Disability, or by Executive pursuant to Section 4.1 (Without Cause, Upon Notice), then the Company's obligation to compensate Executive ceases on the Separation Date except for the Accrued Obligations.

5.2 By the Company Without Cause or by Executive for Good Reason. If the Company terminates Executive's employment and this Agreement pursuant to Section 4.1 (Without Cause, Upon Notice) or Executive terminates Executive's employment and this Agreement pursuant to Section 4.4 (for Good Reason), subject to Executive's continued compliance with Executive's obligations under the Restrictive Covenant Agreement then the Company shall pay Executive the Accrued Obligations and subject to Section 5.5 (Required Release), Executive shall be entitled to the following:

5.2.1 pay Executive an amount equal to nine (9) months of Executive's then current monthly base salary (less applicable taxes and withholdings (the "Severance Period"), payable in substantially equal monthly installments on the same payroll schedule applicable to Executive immediately prior to Executive's separation from service and commencing on the first such payroll date on or following the date on which the release of claims required by Section 5.5 becomes effective and non-revocable, but not later than ninety (90) days following termination from employment; provided however that if the 90th day following Executive's termination from employment occurs in the year following the year in which Executive's termination occurs, then the payments shall commence no earlier than January 1 of such subsequent year and provided further that if such payments commence in such subsequent year, the first such payment shall be a lump sum in an amount equal to the payments that would have come due since Executive's separation from service, and

5.2.2 If Executive timely and properly elects health continuation coverage under the Consolidated Omnibus Budget Reconciliation Act of 1985 ("COBRA"), during the Severance Period, the Company shall reimburse Executive for the difference between the monthly COBRA premium paid by the Executive for and the monthly premium amount paid by Executive immediately prior to the date that Executive's employment terminated. Such reimbursement shall be paid to the Executive on or before the tenth (10th) day of the month immediately following the month in which the Executive timely remits the premium payment, with such reimbursements to commence when the payments under Section 5.2.1 commence. Executive shall be eligible to receive such reimbursement until the earliest of: (i) the twelfth-month anniversary of the Separation Date; (ii) the date the Executive is no longer eligible to receive COBRA continuation coverage; and (iii) the date on which the Executive becomes eligible to receive substantially similar coverage from another employer or other source. Notwithstanding the foregoing, if the Company's making payments under this Section 5.2.2 would violate the nondiscrimination rules applicable to non-grandfathered plans under the Affordable Care Act (the "ACA"), or result in the imposition of penalties under the ACA and the related regulations and guidance promulgated thereunder), the parties agree to reform this Section 5.2.2 in a manner as is necessary to comply with the ACA. Executive shall provide the Company with notice of subsequent employment and comparable coverage within thirty (30) days of commencement of such comparable coverage.

5.3 Following a Change in Control, by the Company Without Cause or by Executive for Good Reason. If within three (3) month prior to or twelve (12) months following the occurrence of a Change in Control, as defined herein, either the Company terminates Executive's employment and this Agreement pursuant to Section 4.1 (Without Cause, Upon Notice) or Executive terminates Executive's employment and this Agreement pursuant to Section 4.4 (for Good Reason), then in lieu of any benefits under Section 5.2, and subject to Executive's continue compliance with Executive's obligations under the Restrictive Covenant Agreement, the Company shall pay Executive the Accrued Obligations and, subject to Section 5.5 (Required Release), Executive shall be entitled to the following:

5.3.1 The Company shall pay Executive an amount equal to twelve (12) months of Executive's then current monthly base salary (less applicable taxes and withholdings) (the "CIC Severance Period") plus 1 times Executive's target bonus for the year during which the Separation Date occurs, payable in lump sum Seventy-five (75) days following the Separation Date;

5.3.2 If Executive timely and properly elects health continuation coverage under COBRA, during the CIC Severance Period, the Company shall reimburse Executive for the difference between the monthly COBRA premium paid by the Executive for and the monthly premium amount paid by Executive immediately prior to the date that Executive's employment terminated. Such reimbursement shall be paid to the Executive on or before the tenth (10th) day of the month immediately following the month in which Executive timely remits the premium payment, with such reimbursements to commence in the month following the month the release under Section 5.4 becomes effective and non-revocable. Executive shall be eligible to receive such reimbursement until the earliest of: (i) the twelfth-month anniversary of the Separation Date; (ii) the date the Executive is no longer eligible to receive COBRA continuation coverage; and (iii) the date on which the Executive becomes eligible to receive substantially similar

coverage from another employer or other source. Notwithstanding the foregoing, if the Company's making payments under this Section 5.3.2 would violate the nondiscrimination rules applicable to non-grandfathered plans under the ACA, or result in the imposition of penalties under the ACA and the related regulations and guidance promulgated thereunder), the parties agree to reform this Section 5.3.2 in a manner as is necessary to comply with the ACA. Executive shall provide the Company with notice of subsequent employment and comparable coverage within thirty (30) days of commencement of such comparable coverage; and

5.3.3 All unvested time-based equity grants shall vest in full as of the Separation Date, provided that such equity shall remain subject to the other terms and conditions of the applicable Company incentive award plan(s) and individual award agreement(s).

5.4 Definition of Change in Control.

5.4.1 "Change in Control" means and includes each of the following:

(a) A transaction or series of transactions (other than an offering of Common Stock to the general public through a registration statement filed with the Securities and Exchange Commission or a transaction or series of transactions that meets the requirements of clauses (i) and (ii) of subsection (c) below) whereby any "person" or related "group" of "persons" (as such terms are used in Sections 13(d) and 14(d)(2) of the Securities Exchange Act of 1934, as amended (the "Exchange Act")) (other than the Company, any of its Subsidiaries, an employee benefit plan maintained by the Company or any of its Subsidiaries or a "person" that, prior to such transaction, directly or indirectly controls, is controlled by, or is under common control with, the Company) directly or indirectly acquires beneficial ownership (within the meaning of Rule 13d-3 under the Exchange Act) of securities of the Company possessing more than 50% of the total combined voting power of the Company's securities outstanding immediately after such acquisition; provided, however, that for purposes of this Agreement, "Subsidiary" means any entity (other than the Company), whether domestic or foreign, in an unbroken chain of entities beginning with the Company if each of the entities other than the last entity in the unbroken chain beneficially owns, at the time of the determination, securities or interests representing at least 50% of the total combined voting power of all classes of securities or interests in one of the other entities in such chain; or

(b) During any period of two consecutive years, individuals who, at the beginning of such period, constitute the Board of Directors (the "Board") together with any new director(s) of the Board (other than a director designated by a person who shall have entered into an agreement with the Company to effect a transaction described in subsections (a) or (c)) whose election by the Board or nomination for election by the Company's stockholders was approved by a vote of at least two-thirds of the directors then still in office who either were directors at the beginning of the two-year period or whose election or nomination for election was previously so approved, cease for any reason to constitute a majority thereof; or

(c) The consummation by the Company (whether directly involving the Company or indirectly involving the Company through one or more intermediaries) of (x) a merger, consolidation, reorganization, or business combination or (y) a sale or other disposition of all or substantially all of the Company's assets in any single transaction or series of related transactions or (z) the acquisition of assets or stock of another entity, in each case other than a transaction:

(i) which results in the Company's voting securities outstanding immediately before the transaction continuing to represent (either by remaining outstanding or by being converted into voting securities of the Company or the person that, as a result of the transaction, controls, directly or indirectly, the Company or owns, directly or indirectly, all or substantially all of the Company's assets or otherwise succeeds to the business of the Company (the Company or such person, the "Successor Entity")) directly or indirectly, at least a majority of the combined voting power of the Successor Entity's outstanding voting securities immediately after the transaction, and

(ii) after which no person or group beneficially owns voting securities representing 50% or more of the combined voting power of the Successor Entity; provided, however, that no person or group shall be treated for purposes of this clause (ii) as beneficially owning 50% or more of the combined voting power of the Successor Entity solely as a result of the voting power held in the Company prior to the consummation of the transaction.

5.4.2 Notwithstanding the foregoing, (i) a Change in Control shall not include an IPO (referenced in Background, Section B of this Agreement); and (ii) if a Change in Control constitutes a payment event under this Agreement that provides for the deferral of compensation that is subject to Section 409A of the Internal Revenue Code of 1986, as amended (the "Code"), and the regulations thereunder (collectively, "Section 409A"), to the extent required to avoid the imposition of additional taxes under Section 409A, the transaction or event described in subsection (a), (b) or (c) with respect to such payment (or portion thereof) shall only constitute a Change in Control for purposes of the payment timing if such transaction also constitutes a "change in control event," as defined in Treasury Regulation Section 1.409A-3(i)(5).

5.4.3 The Company shall have full and final authority, which shall be exercised in its discretion, to determine conclusively whether a Change in Control has occurred pursuant to the above definition, the date of the occurrence of such Change in Control and any incidental matters relating thereto; provided that any exercise of authority in conjunction with a determination of whether a Change in Control is a "change in control event" as defined in Treasury Regulation Section 1.409A-3(i)(5) shall be consistent with such regulation.

5.5 Required Release. Notwithstanding any provision of this Agreement to the contrary, the Company's obligation to provide the payments and reimbursements under Sections 5.2.1, 5.2.2, 5.3.1 and 5.3.2 is conditioned upon Executive's execution of a standard form of an enforceable release of claims and Executive's compliance with the Restrictive Covenant Agreement. If Executive chooses not to execute such a release or fails to comply with the Restrictive Covenant Agreement, then the Company's obligation to compensate Executive ceases on the Separation Date except as to amounts due at the time. The release of claims shall be provided to Executive within ten (10) days of Executive's separation from service and Executive must execute it within the time period specified in the release (which shall not be longer than forty-five (45) days from the date of receipt). Such release shall not be effective until any applicable revocation period has expired.

5.6 Benefits in Lieu of Other Severance. Executive is not entitled to receive any compensation or benefits upon Executive's termination except as: (i) set forth in this Agreement; (ii) otherwise required by law; or (iii) otherwise required by any employee benefit plan in which Executive participates. Moreover, the terms and conditions afforded Executive under this Agreement are in lieu of any severance benefits to which Executive otherwise might be entitled pursuant to any severance plan, policy and practice of the Company.

6. RESTRICTIVE COVENANTS. Executive shall continue to be obligated under the Proprietary Information, Inventions, Non-Competition and Non-Solicitation Agreement, dated July 3, 2017 (the "Restrictive Covenant Agreement"). Executive agrees to abide by the terms of the Restrictive Covenant Agreement, or any other subsequent agreement with the Company relating to proprietary information, inventions, intellectual property, non-competition or non-solicitation, the terms of which are hereby incorporated by reference into this Agreement. Executive acknowledges that the provisions of the Restrictive Covenant Agreement, or any subsequent similar agreement, will survive the termination of Executive's employment and/or the termination of this Agreement.

7. COMPANY PROPERTY. Upon the termination of Executive's employment or upon Company's earlier request, Executive shall: (i) deliver to the Company all records, memoranda, data, documents and other property of any description which refer or relate in any way to trade secrets or confidential information, including all copies thereof, which are in Executive's possession, custody or control; (ii) deliver to the Company all Company property (including, but not limited to, keys, credit cards, customer files, contracts, proposals, work in process, manuals, forms, computer-stored work in process and other computer data, research materials, other items of business information concerning any Company customer, or Company business or business methods, including all copies thereof) which is in Executive's possession, custody or control; (iii) bring all such records, files and other materials up to date before returning them; and (iv) fully cooperate with the Company in winding up Executive's work and transferring that work to other individuals designated by the Company.

8. EMPLOYEE REPRESENTATION. Executive represents and warrants that Executive's employment and obligations under this Agreement will not (i) breach any duty or obligation Executive owes to another or (ii) violate any law, recognized ethics standard or recognized business custom.

9. AMENDMENTS; WAIVERS. This Agreement may not be modified, amended, or terminated except by an instrument in writing, signed by Executive and a duly authorized officer of Company. By an instrument in writing similarly executed, Executive or a duly authorized officer of the Company may waive compliance by the other Party with any specifically identified provision of this Agreement that such other Party was or is obligated to comply with or perform; *provided*, *however*, that such waiver shall not operate as a waiver of, or estoppel with respect to, any other or subsequent failure. No failure to exercise and no delay in exercising any right, remedy, or power hereunder will preclude any other or further exercise of any other right, remedy, or power provided herein or by law or in equity.

10. ENTIRE AGREEMENT. Except as expressly provided in this Agreement, this Agreement: (i) supersedes and cancels all other understandings and agreements, oral or written, with respect to Executive's employment with the Company; (ii) supersedes all other understandings and agreements, oral or written, between the parties with respect to the subject matter of this Agreement; and (iii) constitutes the sole agreement between the parties with respect to this subject matter. Each party acknowledges that: (i) no representations, inducements, promises or agreements, oral or written, have been made by any party or by anyone acting on behalf of any party, which are not embodied in this Agreement; and (ii) no agreement, statement or promise not contained in this Agreement shall be valid. No change or modification of this Agreement shall be valid or binding upon the parties unless such change or modification is in writing and is signed by the parties.

11. SEVERABILITY. If a court of competent jurisdiction holds that any provision or sub-part thereof contained in this Agreement is invalid, illegal, or unenforceable, that invalidity, illegality, or unenforceability shall not affect any other provision in this Agreement.

12. ASSIGNMENT AND SUCCESSORS. The Company may assign its rights and obligations under this Agreement to any of its affiliates or to any successor to all or substantially all of the business or the assets of the Company (by merger or otherwise), and may assign or encumber this Agreement and its rights hereunder as security for indebtedness of the Company and its affiliates. This Agreement shall be binding upon and inure to the benefit of the Company, Executive and their respective successors, assigns, personnel and legal representatives, executors, administrators, heirs, distributees, devisees, and legatees, as applicable. None of Executive's rights or obligations may be assigned or transferred by Executive, other than Executive's rights to payments hereunder, which may be transferred only by will or operation of law.

13. GOVERNING LAW. This Agreement shall be construed, interpreted, and governed in accordance with and by North Carolina law and the applicable provisions of federal law ("Applicable Federal Law"). Any and all claims, controversies, and causes of action arising out of or relating to this Agreement, whether sounding in contract, tort, or statute, shall be governed by the laws of the state of North Carolina, including its statutes of limitations, except for Applicable Federal Law, without giving effect to any North Carolina conflict-of-laws rule that would result in the application of the laws of a different jurisdiction. Both Executive and the Company acknowledge and agree that the state or federal courts located in North Carolina have personal jurisdiction over them and over any dispute arising under this Agreement, and both Executive and the Company irrevocably consent to the jurisdiction of such courts.

14. COUNTERPARTS. This Agreement may be executed in counterparts, each of which shall be an original, with the same effect as if the signatures affixed thereto were upon the same instrument.

15. NOTICES. Any notice, request, claim, demand, document and other communication hereunder to any Party shall be effective upon receipt (or refusal of receipt) and shall be in writing and delivered personally or sent by facsimile or certified or registered mail, postage prepaid, as follows:

15.1 If to the Company, to the Chief Executive Officer of the Company at the Company's headquarters,

15.2 If to Executive, to the last address that the Company has in its personnel records for Executive, or

15.3 At any other address as any Party shall have specified by notice in writing to the other Party.

16. SECTION 409A OF THE INTERNAL REVENUE CODE. The parties intend that the provisions of this Agreement comply with Section 409A of the Code and all provisions of this Agreement shall be construed in a manner consistent with the requirements for avoiding taxes or penalties under Section 409A. If any provision of this Agreement (or of any award of compensation, including equity compensation or benefits) would cause Executive to incur any additional tax or interest under Section 409A, the Company shall, upon the specific request of Executive, use its reasonable business efforts to in good faith reform such provision to comply with Code Section 409A; provided, that to the maximum extent practicable, the original intent and economic benefit to Executive and the Company of the applicable provision shall be maintained, and the Company shall have no obligation to make any changes that could create any additional economic cost or loss of benefit to the Company. The Company shall timely use its reasonable business efforts to amend any plans and programs in which Executive participates to bring it in compliance with Section 409A. Notwithstanding the foregoing, the Company shall have no liability with regard to any failure to comply with Section 409A so long as it has acted in good faith with regard to compliance therewith.

16.1 Separation from Service. A termination of employment shall not be deemed to have occurred for purposes of any provision of this Agreement providing for the payment of any amounts or benefits upon or following a termination of employment unless such termination also constitutes a "Separation from Service" within the meaning of Section 409A and, for purposes of any such provision of this Agreement, references to a "termination," "termination of employment," "separation from service" or like terms shall mean Separation from Service.

16.2 Separate Payments. Each installment payment required under this Agreement shall be considered a separate payment for purposes of Section 409A.

16.3 Delayed Distribution to Specified Employee. If the Company determines in accordance with Sections 409A and 416(i) of the Code and the regulations promulgated thereunder, in the Company's sole discretion, that Executive is a Specified Employee of the Company on the date Executive's employment with the Company terminates and that a delay in benefits provided under this Agreement is necessary to comply with Code Section 409A(A)(2)(B)(i), then any severance payments and any continuation of benefits or reimbursement of benefit costs provided by this Agreement, and not otherwise exempt from Section 409A, shall be delayed for a period of six (6) months following the date of termination of Executive's employment (the "409A Delay Period"). In such event, any severance payments and the cost of any continuation of benefits provided under this Agreement that would otherwise be due and payable to Executive during the 409A Delay Period shall be paid to Executive in a lump sum cash amount in the month following the end of the 409A Delay Period. For purposes of this Agreement, "Specified Employee" shall mean an employee who, on an Identification Date ("Identification Date" shall mean each December 31) is a specified employee as defined in Section 416(i) of the Code without regard to paragraph (5) thereof. If Executive is identified as a Specified Employee on an Identification Date, then Executive shall be considered a Specified Employee for purposes of this Agreement during the period beginning on the first April 1 following the Identification Date and ending on the following March 31.

16.4 Reimbursements. To the extent required by Section 409A, each reimbursement or in-kind benefit provided under this Agreement shall be provided in accordance with the following: (a) the amount of expenses eligible for reimbursement, or in-kind benefits provided, during each calendar year cannot affect the expenses eligible for reimbursement, or in-kind benefits to be provided, in any other calendar year; (b) any reimbursement of an eligible expense shall be paid to Executive on or before the last day of the calendar year following the calendar year in which the expense was incurred; and (c) any right to reimbursements or in-kind benefits under this Agreement shall not be subject to liquidation or exchange for another benefit.

17. PARACHUTE PAYMENTS. Notwithstanding any other provisions of this Agreement or any Company equity plan or agreement, in the event that any payment or benefit by the Company or otherwise to or for the benefit of Executive, whether paid or payable or distributed or distributable pursuant to the terms of this Agreement or otherwise (all such payments and benefits, including the payments and benefits under Section 5 hereof, being hereinafter referred to as the "Total Payments"), would be subject (in whole or in part) to the excise tax imposed by Section 4999 of the Code (the "Excise Tax"), then the Total Payments shall be reduced (in the order provided in Section 16.1) to the minimum extent necessary to avoid the imposition of the Excise Tax on the Total Payments, but only if (i) the net amount of such Total Payments, as so reduced (and after subtracting the net amount of federal, state and local income and employment taxes on such reduced Total Payments and after taking into account the phase out of itemized deductions and personal exemptions attributable to such reduced Total Payments), is greater than or equal to (ii) the net amount of such Total Payments without such reduction (but after subtracting the net amount of federal, state and local income and employment taxes on such Total Payments and the amount of the Excise Tax to which Executive would be subject in respect of such unreduced Total Payments and after taking into account the phase out of itemized deductions and personal exemptions attributable to such unreduced Total Payments).

17.1 Order of Reduction. The Total Payments shall be reduced in the following order: (i) reduction on a pro-rata basis of any cash severance payments that are exempt from Section 409A of the Code, (ii) reduction on a pro-rata basis of any non-cash severance payments or benefits that are exempt from Section 409A, (iii) reduction on a pro-rata basis of any other payments or benefits that are exempt from Section 409A, and (iv) reduction of any payments or benefits otherwise payable to Executive on a pro-rata basis or such other manner that complies with Section 409A; provided, in case of clauses (ii), (iii) and (iv), that reduction of any payments attributable to the acceleration of vesting of Company equity awards shall be first applied to Company equity awards that would otherwise vest last in time.

17.2 Determinations. All determinations regarding the application of this Section 17 shall be made by an accounting firm or consulting group with experience in performing calculations regarding the applicability of Section 280G of the Code and the Excise Tax selected by the Company (the "Independent Advisors"). For purposes of determinations, no portion of the Total Payments shall be taken into account which, in the opinion of the Independent Advisors, (i) does not constitute a "parachute payment" within the meaning of Section 280G(b)(2) of the Code

(including by reason of Section 280G(b)(4)(A) of the Code) or (ii) constitutes reasonable compensation for services actually rendered, within the meaning of Section 280G(b)(4)(B) of the Code, in excess of the "base amount" (as defined in Section 280G(b)(3) of the Code) allocable to such reasonable compensation. The costs of obtaining such determination and all related fees and expenses (including related fees and expenses incurred in any later audit) shall be borne by the Company.

17.3 Additional Reductions. In the event it is later determined that a greater reduction in the Total Payments should have been made to implement the objective and intent of this Section 17, the excess amount shall be returned promptly by Executive to the Company.

[The remainder of this page is intentionally left blank.]

IN WITNESS WHEREOF, the parties have entered into this Agreement on the day and year first written above.

DAVID THOMSON

/s/ David Thomson

PRECISION BIOSCIENCES, INC.

By: /s/ Matthew Kane

Title: Chief Executive Officer

Exhibit 10.16

AMENDED AND RESTATED
EXECUTIVE EMPLOYMENT AGREEMENT

This Amended and Restated Executive Employment Agreement (the "Agreement") is made and entered into as of this 27th day of February, 2019 (the "Effective Date"), by and between Precision BioSciences, Inc. (the "Company"), and Fayaz Khazi ("Executive"). The Company and Executive are sometimes referred to in this Agreement individually as a "Party" and collectively as the "Parties."

BACKGROUND

A. Executive has been employed by the Company and subject to the terms of an Employment Agreement, dated May 1, 2017 (the "Prior Agreement"), the terms of which are currently in effect. Executive and the Company wish to update the Prior Employment Agreement, and provide for additional compensation and benefits to Executive.

B. Both Executive and the Company wish to continue the employment relationship on the updated terms set forth in this Agreement, which provide Executive with greater benefits than those under the Prior Agreement, some of which will be conditioned upon the Company's consummation of its initial public offering (the "IPO"), which offering will be effective with the filing of an effective registration statement under the Securities Act of 1933, as amended (the "Effective Date of the IPO"). This Agreement is intended to replace and supersede the Prior Agreement as of the Effective Date of this Agreement.

NOW, THEREFORE, in consideration of the foregoing, of the mutual promises herein, and of other good and valuable consideration, including the continued employment of the Executive by the Company and the compensation to be received by the Executive from the Company from time to time, and specifically the compensation to be received by the Executive pursuant to Section 4 hereof, the receipt and sufficiency of which are hereby acknowledged, the parties hereto, intending legally to be bound, hereby agree as follows:

1. EMPLOYMENT. As of the Effective Date, the Company hereby continues to employ the Executive and Executive hereby accepts employment as the Chief Executive Officer, Elo of the Company upon the terms and conditions of this Agreement. As of the Effective Date, the parties agree that the Prior Agreement shall terminate.

2. NATURE OF EMPLOYMENT/DUTIES. Executive shall serve as the Chief Executive Officer, Elo of the Company and shall have such responsibilities and authority as the Company may designate from time to time consistent with Executive's title and position.

2.1 Executive shall perform all duties and exercise all authority in accordance with, and otherwise comply with, all Company policies, procedures, practices and directions.

2.2 Executive shall devote substantially all working time, best efforts, knowledge and experience to perform successfully Executive's duties and advance the Company's interests. During Executive's employment, Executive may, with the Board's consent (which shall not be unreasonably withheld), engage in other business activities for compensation (including board memberships), provided that, such activities do not present a conflict of interest nor violate the Restrictive Covenant Agreement (defined in Section 6), nor otherwise prohibit Executive from fulfilling Executive's obligations hereunder.

3. COMPENSATION.

3.1 Base Salary. Executive's initial annual base salary for all services rendered shall be Three Hundred Thirty Five Thousand and 00/100 Dollars ($335,000) (less applicable taxes and withholdings) payable in accordance with the Company's payroll practices as they may exist from time to time (such salary, as adjusted in accordance with this Section 3.1, referred to herein as "Base Salary"). Effective as of the Effective Date of the IPO, Executive's Base Salary shall be raised to Three Hundred Forty Five Thousand and 00/100 Dollars ($345,000) (less applicable taxes and withholdings). Base Salary may be reviewed and adjusted by the Company, at its discretion, in accordance with the Company's policies, procedures, and practices as they may exist from time to time, provided that the Base Salary shall not be decreased unless the decrease is an across-the-board decrease for all senior management employees of the Company.

3.2 Business Expenses. Executive shall be reimbursed for reasonable and necessary expenses actually incurred by Executive in performing services under this Agreement in accordance with and subject to the terms and conditions of the applicable Company reimbursement policies, procedures, and practices as they may exist from time to time. All such reimbursements shall be made no later than the end of the calendar year following the year in which the expense was incurred.

3.3 Bonus. Executive may participate in any Company bonus plan the Company may adopt for senior management subject to the terms, conditions, and any eligibility requirements that may exist in such plan or plans. Effective as of the Effective Date of the IPO, Executive's annual incentive compensation under such bonus plan (the "Annual Bonus") shall be targeted at 40% of Executive's Base Salary (such target, as may be increased by the Board from time to time, the "Target Annual Bonus"). The Annual Bonus payable under the bonus plan shall be based on the achievement of performance goals to be determined by the Board. The payment of any Annual Bonus pursuant to the bonus plan shall be subject to Executive's continued employment with the Company through the date of payment.

3.4 Equity. Executive shall be eligible to participate in any equity compensation plan or similar program adopted by the Company when approved by the Board and, if applicable, the Company's shareholders, for executives at Executive's level. The amount awarded, if any, to the Executive under any such plan shall be in the discretion of the Board or any committee administering such plan and shall be subject to the terms and conditions of any plan or program adopted or approved by the Board.

3.5 Benefits. Executive may participate in all medical, dental and disability insurance, 401(k), personal leave and other employee benefit plans and programs of the Company for which Executive is eligible, provided, however, that Executive's participation in benefit plans and programs is subject to the applicable terms, conditions and eligibility requirements of these plans and programs, some of which are within the plan administrator's discretion, as they may exist from time to time. The Company shall pay annual dues and expenses for Executive's membership and participation in such professional organizations as may be approved by the Board.

4. TERM OF EMPLOYMENT AND TERMINATION. The Company and Executive acknowledge that Executive's employment is and shall continue to be at-will, as defined under applicable law, and that Executive's employment with the Company may be terminated by either Party at any time for any or no reason (subject to the notice requirements of this Section 4). This "at-will" nature of Executive's employment shall remain unchanged during Executive's tenure as an employee and may not be changed, except in an express writing signed by Executive and a duly authorized officer of the Company. The term of this Agreement and Executive's employment hereunder shall commence on the Effective Date and continue until terminated as set forth in this Section 4. The date on which Executive's employment terminates, as determined by the Company, regardless of the reason, shall be referred to herein as the "Separation Date." Upon termination of Executive's employment for any reason, Executive shall be deemed to have resigned from all offices and directorships, if any, then held with the Company or any of its subsidiaries.

4.1 Without Cause, Upon Notice. Either the Company or Executive may terminate Executive's employment and this Agreement without Cause at any time upon giving the other party thirty (30) days written notice.

4.2 For Cause. The Company may terminate Executive's employment and this Agreement immediately without notice at any time for "Cause," which shall mean the following:

4.2.1 Executive's material failure to perform Executive's duties or to carryout the reasonable and lawful instructions of the Chief Executive Officer or the Board of Directors (other than any such failure resulting from incapacity due to physical or mental illness);

4.2.2 Executive's engagement in dishonesty, illegal conduct, or gross misconduct, which is, in each case, materially injurious to the Company or its affiliates;

4.2.3 Executive's embezzlement, misappropriation, or fraud, whether or not related to the Executive's employment with the Company;

4.2.4 Executive's conviction of or plea of guilty or nolo contendere to a crime that constitutes a felony (or state law equivalent) or a crime that constitutes a misdemeanor involving moral turpitude;

4.2.5 Executive's failure to cooperate with the Company in any investigation or formal proceeding;

4.2.6 Executive's material breach of any material obligation under this Agreement, the Restrictive Covenant Agreement (as defined in Section 6), or any other written agreement between the Executive and the Company; or

4.2.7 any material failure by Executive to comply with the Company's written policies or rules, as they may be in effect from time to time.

Provided, however, that prior to termination based on Sections 4.2.1, 4.2.7 or 4.2.8, Executive shall be given written notice of the facts allegedly constituting Cause and a ten (10) day opportunity to cure.

4.3 By Death or Disability. Executive's employment and this Agreement shall terminate upon Executive's Disability or death. For purposes of this Agreement, "Disability" shall mean Executive's inability, due to physical or mental incapacity, to perform the essential functions of Executive's job, with or without reasonable accommodation, for one hundred eighty (180) days out of any three hundred sixty-five (365) day period; provided however, in the event that the Company temporarily replaces the Executive, or transfers the Executive's duties or responsibilities to another individual on account of the Executive's inability to perform such duties due to a mental or physical incapacity which is, or is reasonably expected to become, a Disability, then the Executive's employment shall not be deemed terminated by the Company. Any question as to the existence of the Executive's Disability as to which the Executive and the Company cannot agree shall be determined in writing by a qualified independent physician mutually acceptable to the Executive and the Company. If the Executive and the Company cannot agree as to a qualified independent physician, each shall appoint such a physician and those two physicians shall select a third who shall make such determination in writing. The determination of Disability made in writing to the Company and the Executive shall be final and conclusive for all purposes of this Agreement. The Company shall give Executive written notice of termination for Disability and the termination shall be effective as of the date specified in such notice.

4.4 For Good Reason. Executive may terminate Executive's employment for "Good Reason," which shall mean the occurrence of any of the following, in each case without the Executive's written consent:

4.4.1 a material reduction in Executive's Base Salary other than a general reduction in Base Salary that affects all similarly situated executives;

4.4.2 an involuntary relocation of the Executive's principal place of employment by more than thirty five (35) miles; or

4.4.3 the Company's failure to obtain an agreement from any successor to the Company to assume and agree to perform this Agreement in the same manner and to the same extent that the Company would be required to perform if no succession had taken place, except where such assumption occurs by operation of law.

Executive cannot terminate Executive's employment for Good Reason unless Executive has provided written notice to the Company of the existence of the circumstances providing grounds for termination for Good Reason within thirty (30) days of the initial existence of such grounds and the Company has had at least thirty (30) days from the date on which such notice is provided to cure such circumstances. If the Executive does not terminate Executive's employment for Good Reason within sixty (60) days after the first occurrence of the applicable grounds, then the Executive will be deemed to have waived Executive's right to terminate for Good Reason with respect to such grounds.

5. COMPENSATION AND BENEFITS UPON TERMINATION. If Executive's employment terminates for any reason, Executive shall not be entitled to any payments, benefits, damages, award or compensation other than as provided in this Agreement or otherwise agreed to in writing by the Company or as provided by applicable law. Upon termination of Executive's employment pursuant to any of the circumstances listed in Section 4, Executive (or Executive's estate) shall be entitled to receive the sum of: (i) the portion of Executive's Base Salary earned through the Separation Date, but not yet paid to Executive; (ii) any expense reimbursements owed to Executive pursuant to Section 3.2; and (iii) any amount accrued and arising from Executive's participation in, or benefits accrued under any employee benefit plans, programs or arrangements, which amounts shall be payable in accordance with the terms and conditions of such employee benefit plans, programs or arrangements (collectively, the "Accrued Obligations"). Except as otherwise expressly required by law (e.g., COBRA) or as specifically provided herein, all of Executive's rights to salary, severance, benefits, bonuses and other compensatory amounts hereunder (if any) shall cease upon the termination of Executive's employment hereunder. In the event that Executive's employment is terminated by the Company for any reason, Executive's sole and exclusive remedy shall be to receive the payments and benefits described in this Section 5.

5.1 By the Company for Cause or because of Executive's Death or Disability, or by Executive Without Cause, Upon Notice. If Executive's employment and this Agreement are terminated by the Company for Cause or because of Executive's death or Disability, or by Executive pursuant to Section 4.1 (Without Cause, Upon Notice), then the Company's obligation to compensate Executive ceases on the Separation Date except for the Accrued Obligations.

5.2 By the Company Without Cause or by Executive for Good Reason. If the Company terminates Executive's employment and this Agreement pursuant to Section 4.1 (Without Cause, Upon Notice) or Executive terminates Executive's employment and this Agreement pursuant to Section 4.4 (for Good Reason), subject to Executive's continued compliance with Executive's obligations under the Restrictive Covenant Agreement then the Company shall pay Executive the Accrued Obligations and subject to Section 5.5 (Required Release), Executive shall be entitled to the following:

5.2.1 pay Executive an amount equal to nine (9) months of Executive's then current monthly base salary (less applicable taxes and withholdings (the "Severance Period"), payable in substantially equal monthly installments on the same payroll schedule applicable to Executive immediately prior to Executive's separation from service and commencing on the first such payroll date on or following the date on which the release of claims required by Section 5.5 becomes effective and non-revocable, but not later than ninety (90) days following termination from employment; provided however that if the 90th day following Executive's termination from employment occurs in the year following the year in which Executive's termination occurs, then the payments shall commence no earlier than January 1 of such subsequent year and provided further that if such payments commence in such subsequent year, the first such payment shall be a lump sum in an amount equal to the payments that would have come due since Executive's separation from service, and

5.2.2 If Executive timely and properly elects health continuation coverage under the Consolidated Omnibus Budget Reconciliation Act of 1985 ("COBRA"), during the Severance Period, the Company shall reimburse Executive for the difference between the monthly COBRA premium paid by the Executive for and the monthly premium amount paid by Executive immediately prior to the date that Executive's employment terminated. Such reimbursement shall be paid to the Executive on or before the tenth (10th) day of the month immediately following the month in which the Executive timely remits the premium payment, with such reimbursements to commence when the payments under Section 5.2.1 commence. Executive shall be eligible to receive such reimbursement until the earliest of: (i) the twelfth-month anniversary of the Separation Date; (ii) the date the Executive is no longer eligible to receive COBRA continuation coverage; and (iii) the date on which the Executive becomes eligible to receive substantially similar coverage from another employer or other source. Notwithstanding the foregoing, if the Company's making payments under this Section 5.2.2 would violate the nondiscrimination rules applicable to non-grandfathered plans under the Affordable Care Act (the "ACA"), or result in the imposition of penalties under the ACA and the related regulations and guidance promulgated thereunder), the parties agree to reform this Section 5.2.2 in a manner as is necessary to comply with the ACA. Executive shall provide the Company with notice of subsequent employment and comparable coverage within thirty (30) days of commencement of such comparable coverage.

5.3 Following a Change in Control, by the Company Without Cause or by Executive for Good Reason. If within three (3) month prior to or twelve (12) months following the occurrence of a Change in Control, as defined herein, either the Company terminates Executive's employment and this Agreement pursuant to Section 4.1 (Without Cause, Upon Notice) or Executive terminates Executive's employment and this Agreement pursuant to Section 4.4 (for Good Reason), then in lieu of any benefits under Section 5.2, and subject to Executive's continue compliance with Executive's obligations under the Restrictive Covenant Agreement, the Company shall pay Executive the Accrued Obligations and, subject to Section 5.5 (Required Release), Executive shall be entitled to the following:

5.3.1 The Company shall pay Executive an amount equal to twelve (12) months of Executive's then current monthly base salary (less applicable taxes and withholdings) (the "CIC Severance Period") plus 1 times Executive's target bonus for the year during which the Separation Date occurs, payable in lump sum Seventy-five (75) days following the Separation Date;

5.3.2 If Executive timely and properly elects health continuation coverage under COBRA, during the CIC Severance Period, the Company shall reimburse Executive for the difference between the monthly COBRA premium paid by the Executive for and the monthly premium amount paid by Executive immediately prior to the date that Executive's employment terminated. Such reimbursement shall be paid to the Executive on or before the tenth (10th) day of the month immediately following the month in which Executive

timely remits the premium payment, with such reimbursements to commence in the month following the month the release under Section 5.4 becomes effective and non-revocable. Executive shall be eligible to receive such reimbursement until the earliest of: (i) the twelfth-month anniversary of the Separation Date; (ii) the date the Executive is no longer eligible to receive COBRA continuation coverage; and (iii) the date on which the Executive becomes eligible to receive substantially similar coverage from another employer or other source. Notwithstanding the foregoing, if the Company's making payments under this Section 5.3.2 would violate the nondiscrimination rules applicable to non-grandfathered plans under the ACA, or result in the imposition of penalties under the ACA and the related regulations and guidance promulgated thereunder), the parties agree to reform this Section 5.3.2 in a manner as is necessary to comply with the ACA. Executive shall provide the Company with notice of subsequent employment and comparable coverage within thirty (30) days of commencement of such comparable coverage; and

5.3.3 All unvested time-based equity grants shall vest in full as of the Separation Date, provided that such equity shall remain subject to the other terms and conditions of the applicable Company incentive award plan(s) and individual award agreement(s).

5.4 Definition of Change in Control.

5.4.1 "Change in Control" means and includes each of the following:

(a) A transaction or series of transactions (other than an offering of Common Stock to the general public through a registration statement filed with the Securities and Exchange Commission or a transaction or series of transactions that meets the requirements of clauses (i) and (ii) of subsection (c) below) whereby any "person" or related "group" of "persons" (as such terms are used in Sections 13(d) and 14(d)(2) of the Securities Exchange Act of 1934, as amended (the "Exchange Act")) (other than the Company, any of its Subsidiaries, an employee benefit plan maintained by the Company or any of its Subsidiaries or a "person" that, prior to such transaction, directly or indirectly controls, is controlled by, or is under common control with, the Company) directly or indirectly acquires beneficial ownership (within the meaning of Rule 13d-3 under the Exchange Act) of securities of the Company possessing more than 50% of the total combined voting power of the Company's securities outstanding immediately after such acquisition; provided, however, that for purposes of this Agreement, "Subsidiary" means any entity (other than the Company), whether domestic or foreign, in an unbroken chain of entities beginning with the Company if each of the entities other than the last entity in the unbroken chain beneficially owns, at the time of the determination, securities or interests representing at least 50% of the total combined voting power of all classes of securities or interests in one of the other entities in such chain; or

(b) During any period of two consecutive years, individuals who, at the beginning of such period, constitute the Board of Directors (the "Board") together with any new director(s) of the Board (other than a director designated by a person who shall have entered into an agreement with the Company to effect a transaction described in subsections (a) or (c)) whose election by the Board or nomination for election by the Company's stockholders was approved by a vote of at least two-thirds of the directors then still in office who either were directors at the beginning of the two-year period or whose election or nomination for election was previously so approved, cease for any reason to constitute a majority thereof; or

(c) The consummation by the Company (whether directly involving the Company or indirectly involving the Company through one or more intermediaries) of (x) a merger, consolidation, reorganization, or business combination or (y) a sale or other disposition of all or substantially all of the Company's assets in any single transaction or series of related transactions or (z) the acquisition of assets or stock of another entity, in each case other than a transaction:

(i) which results in the Company's voting securities outstanding immediately before the transaction continuing to represent (either by remaining outstanding or by being converted into voting securities of the Company or the person that, as a result of the transaction, controls, directly or indirectly, the Company or owns, directly or indirectly, all or substantially all of the Company's assets or otherwise succeeds to the business of the Company (the Company or such person, the "Successor Entity")) directly or indirectly, at least a majority of the combined voting power of the Successor Entity's outstanding voting securities immediately after the transaction, and

(ii) after which no person or group beneficially owns voting securities representing 50% or more of the combined voting power of the Successor Entity; provided, however, that no person or group shall be treated for purposes of this clause (ii) as beneficially owning 50% or more of the combined voting power of the Successor Entity solely as a result of the voting power held in the Company prior to the consummation of the transaction.

5.4.2 Notwithstanding the foregoing, (i) a Change in Control shall not include an IPO (referenced in Background, Section B of this Agreement); and (ii) if a Change in Control constitutes a payment event under this Agreement that provides for the deferral of compensation that is subject to Section 409A of the Internal Revenue Code of 1986, as amended (the "Code"), and the regulations thereunder (collectively, "Section 409A"), to the extent required to avoid the imposition of additional taxes under Section 409A, the transaction or event described in subsection (a), (b) or (c) with respect to such payment (or portion thereof) shall only constitute a Change in Control for purposes of the payment timing if such transaction also constitutes a "change in control event," as defined in Treasury Regulation Section 1.409A-3(i)(5).

5.4.3 The Company shall have full and final authority, which shall be exercised in its discretion, to determine conclusively whether a Change in Control has occurred pursuant to the above definition, the date of the occurrence of such Change in Control and any incidental matters relating thereto; provided that any exercise of authority in conjunction with a determination of whether a Change in Control is a "change in control event" as defined in Treasury Regulation Section 1.409A-3(i)(5) shall be consistent with such regulation.

5.5 Required Release. Notwithstanding any provision of this Agreement to the contrary, the Company's obligation to provide the payments and reimbursements under Sections 5.2.1, 5.2.2, 5.3.1 and 5.3.2 is conditioned upon Executive's execution of a standard form of an enforceable release of claims and Executive's compliance with the Restrictive Covenant Agreement. If Executive chooses not to execute such a release or fails to comply with the Restrictive Covenant Agreement, then the Company's obligation to compensate Executive ceases on the Separation Date except as to amounts due at the time. The release of claims shall be provided to Executive within ten (10) days of Executive's separation from service and Executive must execute it within the time period specified in the release (which shall not be longer than forty-five (45) days from the date of receipt). Such release shall not be effective until any applicable revocation period has expired.

5.6 Benefits in Lieu of Other Severance. Executive is not entitled to receive any compensation or benefits upon Executive's termination except as: (i) set forth in this Agreement; (ii) otherwise required by law; or (iii) otherwise required by any employee benefit plan in which Executive participates. Moreover, the terms and conditions afforded Executive under this Agreement are in lieu of any severance benefits to which Executive otherwise might be entitled pursuant to any severance plan, policy and practice of the Company.

6. RESTRICTIVE COVENANTS. Executive shall continue to be obligated under the Proprietary Information, Inventions, Non-Competition and Non-Solicitation Agreement, dated May 1, 2017 (the "Restrictive Covenant Agreement"). Executive agrees to abide by the terms of the Restrictive Covenant Agreement, or any other subsequent agreement with the Company relating to proprietary information, inventions, intellectual property, non-competition or non-solicitation, the terms of which are hereby incorporated by reference into this Agreement. Executive acknowledges that the provisions of the Restrictive Covenant Agreement, or any subsequent similar agreement, will survive the termination of Executive's employment and/or the termination of this Agreement.

7. COMPANY PROPERTY. Upon the termination of Executive's employment or upon Company's earlier request, Executive shall: (i) deliver to the Company all records, memoranda, data, documents and other property of any description which refer or relate in any way to trade secrets or confidential information, including all copies thereof, which are in Executive's possession, custody or control; (ii) deliver to the Company all Company property (including, but not limited to, keys, credit cards, customer files, contracts, proposals, work in process, manuals, forms, computer-stored work in process and other computer data, research materials, other items of business information concerning any Company customer, or Company business or business methods, including all copies thereof) which is in Executive's possession, custody or control; (iii) bring all such records, files and other materials up to date before returning them; and (iv) fully cooperate with the Company in winding up Executive's work and transferring that work to other individuals designated by the Company.

8. EMPLOYEE REPRESENTATION. Executive represents and warrants that Executive's employment and obligations under this Agreement will not (i) breach any duty or obligation Executive owes to another or (ii) violate any law, recognized ethics standard or recognized business custom.

9. AMENDMENTS; WAIVERS. This Agreement may not be modified, amended, or terminated except by an instrument in writing, signed by Executive and a duly authorized officer of Company. By an instrument in writing similarly executed, Executive or a duly authorized officer of the Company may waive compliance by the other Party with any specifically identified provision of this Agreement that such other Party was or is obligated to comply with or perform; *provided*, *however*, that such waiver shall not operate as a waiver of, or estoppel with respect to, any other or subsequent failure. No failure to exercise and no delay in exercising any right, remedy, or power hereunder will preclude any other or further exercise of any other right, remedy, or power provided herein or by law or in equity.

10. ENTIRE AGREEMENT. Except as expressly provided in this Agreement, this Agreement: (i) supersedes and cancels all other understandings and agreements, oral or written, with respect to Executive's employment with the Company; (ii) supersedes all other understandings and agreements, oral or written, between the parties with respect to the subject matter of this Agreement; and (iii) constitutes the sole agreement between the parties with respect to this subject matter. Each party acknowledges that: (i) no representations, inducements, promises or agreements, oral or written, have been made by any party or by anyone acting on behalf of any party, which are not embodied in this Agreement; and (ii) no agreement, statement or promise not contained in this Agreement shall be valid. No change or modification of this Agreement shall be valid or binding upon the parties unless such change or modification is in writing and is signed by the parties.

11. SEVERABILITY. If a court of competent jurisdiction holds that any provision or sub-part thereof contained in this Agreement is invalid, illegal, or unenforceable, that invalidity, illegality, or unenforceability shall not affect any other provision in this Agreement.

12. ASSIGNMENT AND SUCCESSORS. The Company may assign its rights and obligations under this Agreement to any of its affiliates or to any successor to all or substantially all of the business or the assets of the Company (by merger or otherwise), and may assign or encumber this Agreement and its rights hereunder as security for indebtedness of the Company and its affiliates. This Agreement shall be binding upon and inure to the benefit of the Company, Executive and their respective successors, assigns, personnel and legal representatives, executors, administrators, heirs, distributees, devisees, and legatees, as applicable. None of Executive's rights or obligations may be assigned or transferred by Executive, other than Executive's rights to payments hereunder, which may be transferred only by will or operation of law.

13. GOVERNING LAW. This Agreement shall be construed, interpreted, and governed in accordance with and by North Carolina law and the applicable provisions of federal law ("Applicable Federal Law"). Any and all claims, controversies, and causes of action arising out of or relating to this Agreement, whether sounding in contract, tort, or statute, shall be governed by the laws of the state of North Carolina, including its statutes of limitations, except for Applicable Federal Law, without giving effect to any North Carolina conflict-of-laws rule that would result in the application of the laws of a different jurisdiction. Both Executive and the Company acknowledge and agree that the state or federal courts located in North Carolina have personal jurisdiction over them and over any dispute arising under this Agreement, and both Executive and the Company irrevocably consent to the jurisdiction of such courts.

14. COUNTERPARTS. This Agreement may be executed in counterparts, each of which shall be an original, with the same effect as if the signatures affixed thereto were upon the same instrument.

15. NOTICES. Any notice, request, claim, demand, document and other communication hereunder to any Party shall be effective upon receipt (or refusal of receipt) and shall be in writing and delivered personally or sent by facsimile or certified or registered mail, postage prepaid, as follows:

15.1 If to the Company, to the Chief Executive Officer of the Company at the Company's headquarters,

15.2 If to Executive, to the last address that the Company has in its personnel records for Executive, or

15.3 At any other address as any Party shall have specified by notice in writing to the other Party.

16. SECTION 409A OF THE INTERNAL REVENUE CODE. The parties intend that the provisions of this Agreement comply with Section 409A of the Code and all provisions of this Agreement shall be construed in a manner consistent with the requirements for avoiding taxes or penalties under Section 409A. If any provision of this Agreement (or of any award of compensation, including equity compensation or benefits) would cause Executive to incur any additional tax or interest under Section 409A, the Company shall, upon the specific request of Executive, use its reasonable business efforts to in good faith reform such provision to comply with Code Section 409A; provided, that to the maximum extent practicable, the original intent and economic benefit to Executive and the Company of the applicable provision shall be maintained, and the Company shall have no obligation to make any changes that could create any additional economic cost or loss of benefit to the Company. The Company shall timely use its reasonable business efforts to amend any plans and programs in which Executive participates to bring it in compliance with Section 409A. Notwithstanding the foregoing, the Company shall have no liability with regard to any failure to comply with Section 409A so long as it has acted in good faith with regard to compliance therewith.

16.1 Separation from Service. A termination of employment shall not be deemed to have occurred for purposes of any provision of this Agreement providing for the payment of any amounts or benefits upon or following a termination of employment unless such termination also constitutes a "Separation from Service" within the meaning of Section 409A and, for purposes of any such provision of this Agreement, references to a "termination," "termination of employment," "separation from service" or like terms shall mean Separation from Service.

16.2 Separate Payments. Each installment payment required under this Agreement shall be considered a separate payment for purposes of Section 409A.

16.3 Delayed Distribution to Specified Employee. If the Company determines in accordance with Sections 409A and 416(i) of the Code and the regulations promulgated thereunder, in the Company's sole discretion, that Executive is a Specified Employee of the Company on the date Executive's employment with the Company terminates and that a delay in benefits provided under this Agreement is necessary to comply with Code Section 409A(A)(2)(B)(i), then any severance payments and any continuation of benefits or reimbursement of benefit costs provided by this Agreement, and not otherwise exempt from Section 409A, shall be delayed for a period of six (6) months following the date of termination of Executive's employment (the "409A Delay Period"). In such event, any severance payments and the cost of any continuation of benefits provided under this Agreement that would otherwise be due and payable to Executive during the 409A Delay Period shall be paid to Executive in a lump sum cash amount in the month following the end of the 409A Delay Period. For purposes of this Agreement, "Specified Employee" shall mean an employee who, on an Identification Date ("Identification Date" shall mean each December 31) is a specified employee as defined in Section 416(i) of the Code without regard to paragraph (5) thereof. If Executive is identified as a Specified Employee on an Identification Date, then Executive shall be considered a Specified Employee for purposes of this Agreement during the period beginning on the first April 1 following the Identification Date and ending on the following March 31.

16.4 Reimbursements. To the extent required by Section 409A, each reimbursement or in-kind benefit provided under this Agreement shall be provided in accordance with the following: (a) the amount of expenses eligible for reimbursement, or in-kind benefits provided, during each calendar year cannot affect the expenses eligible for reimbursement, or in-kind benefits to be provided, in any other calendar year; (b) any reimbursement of an eligible expense shall be paid to Executive on or before the last day of the calendar year following the calendar year in which the expense was incurred; and (c) any right to reimbursements or in-kind benefits under this Agreement shall not be subject to liquidation or exchange for another benefit.

17. PARACHUTE PAYMENTS. Notwithstanding any other provisions of this Agreement or any Company equity plan or agreement, in the event that any payment or benefit by the Company or otherwise to or for the benefit of Executive, whether paid or payable or distributed or distributable pursuant to the terms of this Agreement or otherwise (all such payments and benefits, including the payments and benefits under Section 5 hereof, being hereinafter referred to as the "Total Payments"), would be subject (in whole or in part) to the excise tax imposed by Section 4999 of the Code (the "Excise Tax"), then the Total Payments shall be reduced (in the order provided in Section 16.1) to the minimum extent necessary to avoid the imposition of the Excise Tax on the Total Payments, but only if (i) the net amount of such Total Payments, as so reduced (and after subtracting the net amount of federal, state and local income and employment taxes on such reduced Total Payments and after taking into account the phase out of itemized deductions and personal exemptions attributable to such reduced Total Payments), is greater than or equal to (ii) the net amount of such Total Payments without such reduction (but after subtracting the net amount of federal, state and local income and employment taxes on such Total Payments and the amount of the Excise Tax to which Executive would be subject in respect of such unreduced Total Payments and after taking into account the phase out of itemized deductions and personal exemptions attributable to such unreduced Total Payments).

17.1 Order of Reduction. The Total Payments shall be reduced in the following order: (i) reduction on a pro-rata basis of any cash severance payments that are exempt from Section 409A, (ii) reduction on a pro-rata basis of any non-cash severance payments or benefits that are exempt from Section 409A, (iii) reduction on a pro-rata basis of any other payments or benefits that are exempt from Section 409A, and (iv) reduction of any payments or benefits otherwise payable to Executive on a pro-rata basis or such other manner that complies with Section 409A; provided, in case of clauses (ii), (iii) and (iv), that reduction of any payments attributable to the acceleration of vesting of Company equity awards shall be first applied to Company equity awards that would otherwise vest last in time.

17.2 Determinations. All determinations regarding the application of this Section 17 shall be made by an accounting firm or consulting group with experience in performing calculations regarding the applicability of Section 280G of the Code and the Excise Tax selected by the Company (the "Independent Advisors"). For purposes of determinations, no portion of the Total Payments shall be taken into account which, in the opinion of the Independent Advisors, (i) does not constitute a "parachute payment" within the meaning of Section 280G(b)(2) of the Code (including by reason of Section 280G(b)(4)(A) of the Code) or (ii) constitutes reasonable compensation for services actually rendered, within the meaning of Section 280G(b)(4)(B) of the Code, in excess of the "base amount" (as defined in Section 280G(b)(3) of the Code) allocable to such reasonable compensation. The costs of obtaining such determination and all related fees and expenses (including related fees and expenses incurred in any later audit) shall be borne by the Company.

17.3 Additional Reductions. In the event it is later determined that a greater reduction in the Total Payments should have been made to implement the objective and intent of this Section 17, the excess amount shall be returned promptly by Executive to the Company.

[The remainder of this page is intentionally left blank.]

IN WITNESS WHEREOF, the parties have entered into this Agreement on the day and year first written above.

FAYAZ KHAZI

/s/ Fayaz Khazi

PRECISION BIOSCIENCES, INC.

By: /s/ Matthew Kane

Title: Chief Executive Officer

PRECISION BIOSCIENCES, INC.

FORM OF INDEMNIFICATION AGREEMENT

THIS INDEMNIFICATION AGREEMENT (the "***Agreement***") is made and entered into as of , 2019 between Precision BioSciences, Inc., a Delaware corporation (the "***Company***"), and [Name] ("***Indemnitee***").

WITNESSETH THAT:

WHEREAS, highly competent persons have become more reluctant to serve corporations as directors, officers or in other capacities unless they are provided with adequate protection through insurance or adequate indemnification against inordinate risks of claims and actions against them arising out of their service to and activities on behalf of the corporation;

WHEREAS, the Board of Directors of the Company (the "***Board***") has determined that, in order to attract and retain qualified individuals, the Company will attempt to maintain on an ongoing basis, at its sole expense, liability insurance to protect persons serving the Company and its subsidiaries from certain liabilities. Although the furnishing of such insurance has been a customary and widespread practice among United States-based corporations and other business enterprises, the Company believes that, given current market conditions and trends, such insurance may be available to it in the future only at higher premiums and with more exclusions. At the same time, directors, officers, and other persons in service to corporations or business enterprises are being increasingly subjected to expensive and time-consuming litigation relating to, among other things, matters that traditionally would have been brought only against the Company or business enterprise itself. The Bylaws and Certificate of Incorporation of the Company require indemnification of the officers and directors of the Company. Indemnitee may also be entitled to indemnification pursuant to the General Corporation Law of the State of Delaware ("***DGCL***"). The Bylaws, the Certificate of Incorporation and the DGCL expressly provide that the indemnification provisions set forth therein are not exclusive, and thereby contemplate that contracts may be entered into between the Company and members of the Board, officers and other persons with respect to indemnification;

WHEREAS, the uncertainties relating to such insurance and to indemnification have increased the difficulty of attracting and retaining such persons;

WHEREAS, the Board has determined that the increased difficulty in attracting and retaining such persons is detrimental to the best interests of the Company's stockholders and that the Company should act to assure such persons that there will be increased certainty of such protection in the future;

WHEREAS, it is reasonable, prudent and necessary for the Company contractually to obligate itself to indemnify, and to advance expenses on behalf of, such persons to the fullest extent permitted by applicable law so that they will serve or continue to serve the Company free from undue concern that they will not be so indemnified;

WHEREAS, this Agreement is a supplement to and in furtherance of the Bylaws and Certificate of Incorporation of the Company and any resolutions adopted pursuant thereto, and shall not be deemed a substitute therefor, nor to diminish or abrogate any rights of Indemnitee thereunder; [and]

WHEREAS, Indemnitee does not regard the protection available under the Company's Bylaws, Certificate of Incorporation and insurance as adequate in the present circumstances, and may not be willing to serve as an officer or director without adequate protection, and the Company desires Indemnitee to serve in such capacity. Indemnitee is willing to serve, continue to serve and to take on additional service for or on behalf of the Company on the condition that he be so indemnified; [and]

[WHEREAS, Indemnitee has certain rights to indemnification and/or insurance provided by [NAME] which Indemnitee and [NAME] intend to be secondary to the primary obligation of the Company to indemnify Indemnitee as provided herein, with the Company's acknowledgement and agreement to the foregoing being a material condition to Indemnitee's willingness to serve on the Board;]

NOW, THEREFORE, in consideration of Indemnitee's agreement to serve as an officer or director from and after the date hereof, the parties hereto agree as follows:

1. Indemnity of Indemnitee. The Company hereby agrees to hold harmless and indemnify Indemnitee to the fullest extent permitted by law, as such may be amended from time to time. In furtherance of the foregoing indemnification, and without limiting the generality thereof:

(a) Proceedings Other Than Proceedings by or in the Right of the Company. Indemnitee shall be entitled to the rights of indemnification provided in this Section l(a) if, by reason of his Corporate Status (as hereinafter defined), the Indemnitee is, or is threatened to be made, a party to or participant in any Proceeding (as hereinafter defined) other than a Proceeding by or in the right of the Company. Pursuant to this Section 1(a), Indemnitee shall be indemnified against all Expenses (as hereinafter defined), judgments, penalties, fines and amounts paid in settlement actually and reasonably incurred by him, or on his behalf, in connection with such Proceeding or any claim, issue or matter therein, if the Indemnitee acted in good faith and in a manner the Indemnitee reasonably believed to be in or not opposed to the best interests of the Company, and with respect to any criminal Proceeding, had no reasonable cause to believe the Indemnitee's conduct was unlawful.

(b) Proceedings by or in the Right of the Company. Indemnitee shall be entitled to the rights of indemnification provided in this Section 1(b) if, by reason of his Corporate Status, the Indemnitee is, or is threatened to be made, a party to or participant in any Proceeding brought by or in the right of the Company. Pursuant to this Section 1(b), Indemnitee shall be indemnified against all Expenses actually and reasonably incurred by the Indemnitee, or on the Indemnitee's behalf, in connection with such Proceeding if the Indemnitee acted in good faith and in a manner the Indemnitee reasonably believed to be in or not opposed to the best interests of the Company; provided, however, if applicable law so provides, no indemnification against such Expenses shall be made in respect of any claim, issue or matter in such Proceeding as to which Indemnitee shall have been adjudged to be liable to the Company unless and to the extent that the Court of Chancery of the State of Delaware shall determine that such indemnification may be made.

(c) Indemnification for Expenses of a Party Who is Wholly or Partly Successful. Notwithstanding any other provision of this Agreement, to the extent that Indemnitee is, by reason of his Corporate Status, a party to and is successful, on the merits or otherwise, in any Proceeding, he shall be indemnified to the maximum extent permitted by law, as such may be amended from time to time, against all Expenses actually and reasonably incurred by him or on his behalf in connection therewith. If Indemnitee is not wholly successful in such Proceeding but is successful, on the merits or otherwise, as to one or more but less than all claims, issues or matters in such Proceeding, the Company shall indemnify Indemnitee against all Expenses actually and reasonably incurred by him or on his behalf in connection with each successfully resolved claim, issue or matter. For purposes of this Section and without limitation, the termination of any claim, issue or matter in such a Proceeding by dismissal, with or without prejudice, shall be deemed to be a successful result as to such claim, issue or matter.

(d) Indemnification of Appointing Stockholder. If (i) Indemnitee is or was affiliated with one or more venture capital funds that has invested in the Company (an "***Appointing Stockholder***"), and (ii) the Appointing Stockholder is, or is threatened to be made, a party to or a participant in any Proceeding relating to or arising by reason of Appointing Stockholder's position as a stockholder of, or lender to, the Company, or Appointing Stockholder's appointment of or affiliation with Indemnitee or any other director, including without limitation any alleged misappropriation of a Company asset or corporate opportunity, any claim of misappropriation or infringement of intellectual property relating to the Company, any alleged false or misleading statement or omission made by the Company (or on its behalf) or its employees or agents, or any allegation of inappropriate control or influence over the Company or its Board members, officers, equity holders or debt holders, then the Appointing Stockholder will be entitled to indemnification hereunder for Expenses to the same extent as Indemnitee, and the terms of this Agreement as they relate to procedures for indemnification of Indemnitee and advancement of Expenses shall apply to any such indemnification of Appointing Stockholder.

The rights provided to the Appointing Stockholder under this Section 1(d) shall (i) be suspended during any period during which the Appointing Stockholder does not have a representative on the Company's Board and (ii) terminate on an initial public offering of the Company's Common Stock; provided, however, that in the event of any such suspension or termination, the Appointing Stockholder's rights to indemnification will not be suspended or terminated with respect to any Proceeding based in whole or in part on facts and circumstances occurring at any time prior to such suspension or termination regardless of whether the Proceeding arises before or after such suspension or termination. The Company and Indemnitee agree that the Appointing Stockholder is an express third party beneficiary of the terms of this Section 1(d).

2. Additional Indemnity. In addition to, and without regard to any limitations on, the indemnification provided for in Section 1 of this Agreement, the Company shall and hereby does indemnify and hold harmless Indemnitee against all Expenses, judgments, penalties, fines and amounts paid in settlement actually and reasonably incurred by him or on his behalf if, by reason of his Corporate Status, he is, or is threatened to be made, a party to or participant in any Proceeding (including a Proceeding by or in the right of the Company), including, without limitation, all liability arising out of the negligence or active or passive wrongdoing of Indemnitee. The only limitation that shall exist upon the Company's obligations pursuant to this Agreement shall be that the Company shall not be obligated to make any payment to Indemnitee that is finally determined (under the procedures, and subject to the presumptions, set forth in Sections 6 and 7 hereof) to be unlawful.

3. Contribution.

(a) Whether or not the indemnification provided in Sections 1 and 2 hereof is available, in respect of any threatened, pending or completed action, suit or proceeding in which the Company is jointly liable with Indemnitee (or would be if joined in such action, suit or proceeding), the Company shall pay, in the first instance, the entire amount of any judgment or settlement of such action, suit or proceeding without requiring Indemnitee to contribute to such payment and the Company hereby waives and relinquishes any right of contribution it may have against Indemnitee. The Company shall not enter into any settlement of any action, suit or proceeding in which the Company is jointly liable with Indemnitee (or would be if joined in such action, suit or proceeding) unless such settlement provides for a full and final release of all claims asserted against Indemnitee.

(b) Without diminishing or impairing the obligations of the Company set forth in the preceding subparagraph, if, for any reason, Indemnitee shall elect or be required to pay all or any portion of any judgment or settlement in any threatened, pending or completed action, suit or proceeding in which the Company is jointly liable with Indemnitee (or would be if joined in such action, suit or proceeding), the Company shall contribute to the amount of Expenses, judgments, fines and amounts paid in settlement actually and reasonably incurred and paid or payable by Indemnitee in proportion to the relative benefits received by the Company and all officers, directors or employees of the Company, other than Indemnitee, who are jointly liable with Indemnitee (or would be if joined in such action, suit or proceeding), on the one hand, and Indemnitee, on the other hand, from the transaction or events from which such action, suit or proceeding arose; provided, however, that the proportion determined on the basis of relative benefit may, to the extent necessary to conform to law, be further adjusted by reference to the relative fault of the Company and all officers, directors or employees of the Company other than Indemnitee who are jointly liable with Indemnitee (or would be if joined in such action, suit or proceeding), on the one hand, and Indemnitee, on the other hand, in connection with the transaction or events that resulted in such expenses, judgments, fines or settlement amounts, as well as any other equitable considerations which applicable law may require to be considered. The relative fault of the Company and all officers, directors or employees of the Company, other than Indemnitee, who are jointly liable with Indemnitee (or would be if joined in such action, suit or proceeding), on the one hand, and Indemnitee, on the other hand, shall be determined by reference to, among other things, the degree to which their actions were motivated by intent to gain personal profit or advantage, the degree to which their liability is primary or secondary and the degree to which their conduct is active or passive.

(c) The Company hereby agrees to fully indemnify and hold Indemnitee harmless from any claims of contribution which may be brought by officers, directors or employees of the Company, other than Indemnitee, who may be jointly liable with Indemnitee.

(d) To the fullest extent permissible under applicable law, if the indemnification provided for in this Agreement is unavailable to Indemnitee for any reason whatsoever, the Company, in lieu of indemnifying Indemnitee, shall contribute to the amount incurred by Indemnitee, whether for judgments, fines, penalties, excise taxes, amounts paid or to

be paid in settlement and/or for Expenses, in connection with any claim relating to an indemnifiable event under this Agreement, in such proportion as is deemed fair and reasonable in light of all of the circumstances of such Proceeding in order to reflect (i) the relative benefits received by the Company and Indemnitee as a result of the event(s) and/or transaction(s) giving cause to such Proceeding and/or (ii) the relative fault of the Company (and its directors, officers, employees and agents) and Indemnitee in connection with such event(s) and/or transaction(s).

4. Indemnification for Expenses of a Witness. Notwithstanding any other provision of this Agreement, to the extent that Indemnitee is, by reason of his Corporate Status, a witness, or is made (or asked) to respond to discovery requests, in any Proceeding to which Indemnitee is not a party, he shall be indemnified against all Expenses actually and reasonably incurred by him or on his behalf in connection therewith.

5. Advancement of Expenses. Notwithstanding any other provision of this Agreement, the Company shall advance all Expenses incurred by or on behalf of Indemnitee in connection with any Proceeding by reason of Indemnitee's Corporate Status within thirty (30) days after the receipt by the Company of a statement or statements from Indemnitee requesting such advance or advances from time to time, whether prior to or after final disposition of such Proceeding. Such statement or statements shall reasonably evidence the Expenses incurred by Indemnitee. The Indemnitee shall qualify for advances upon the execution and delivery to the Corporation of this Agreement, which shall constitute an undertaking by Indemnitee to repay any Expenses advanced if it shall ultimately be determined that Indemnitee is not entitled to be indemnified against such Expenses. Any advances and undertakings to repay pursuant to this Section 5 shall be unsecured and interest free.

6. Procedures and Presumptions for Determination of Entitlement to Indemnification. It is the intent of this Agreement to secure for Indemnitee rights of indemnity that are as favorable as may be permitted under the DGCL and public policy of the State of Delaware. Accordingly, the parties agree that the following procedures and presumptions shall apply in the event of any question as to whether Indemnitee is entitled to indemnification under this Agreement:

(a) To obtain indemnification under this Agreement, Indemnitee shall submit to the Company a written request, including therein or therewith such documentation and information as is reasonably available to Indemnitee and is reasonably necessary to determine whether and to what extent Indemnitee is entitled to indemnification. The Secretary of the Company shall, promptly upon receipt of such a request for indemnification, advise the Board in writing that Indemnitee has requested indemnification. Notwithstanding the foregoing, any failure of Indemnitee to provide such a request to the Company, or to provide such a request in a timely fashion, shall not relieve the Company of any liability that it may have to Indemnitee unless, and to the extent that, such failure actually and materially prejudices the interests of the Company.

(b) Upon written request by Indemnitee for indemnification pursuant to the first sentence of Section 6(a) hereof, a determination with respect to Indemnitee's entitlement thereto shall be made in the specific case by one of the following four methods, which shall be at the election of the Board: (1) by a majority vote of the disinterested directors, even though less than a quorum, (2) by a committee of disinterested directors designated by a majority vote of the disinterested directors, even though less than a quorum, (3) if there are no

disinterested directors or if the disinterested directors so direct, by independent legal counsel in a written opinion to the Board, a copy of which shall be delivered to the Indemnitee, or (4) if so directed by the Board, by the stockholders of the Company. For purposes hereof, disinterested directors are those members of the Board who are not parties to the action, suit or proceeding in respect of which indemnification is sought by Indemnitee.

(c) If the determination of entitlement to indemnification is to be made by Independent Counsel pursuant to Section 6(b) hereof, the Independent Counsel shall be selected as provided in this Section 6(c). The Independent Counsel shall be selected by the Board. Indemnitee may, within ten (10) days after such written notice of selection shall have been given, deliver to the Company a written objection to such selection; provided, however, that such objection may be asserted only on the ground that the Independent Counsel so selected does not meet the requirements of "Independent Counsel" as defined in Section 13 of this Agreement, and the objection shall set forth with particularity the factual basis of such assertion. Absent a proper and timely objection, the person so selected shall act as Independent Counsel. If a written objection is made and substantiated, the Independent Counsel selected may not serve as Independent Counsel unless and until such objection is withdrawn or a court has determined that such objection is without merit. If, within twenty (20) days after the conclusion of the Proceeding giving rise to the request for indemnification, no Independent Counsel shall have been selected and not objected to, either the Company or Indemnitee may petition the Court of Chancery of the State of Delaware for resolution of any objection which shall have been made by the Indemnitee to the Company's selection of Independent Counsel and/or for the appointment as Independent Counsel of a person selected by the court or by such other person as the court shall designate, and the person with respect to whom all objections are so resolved or the person so appointed shall act as Independent Counsel under Section 6(b) hereof. The Company shall pay any and all reasonable fees and expenses of Independent Counsel incurred by such Independent Counsel in connection with acting pursuant to Section 6(b) hereof, and the Company shall pay all reasonable fees and expenses incident to the procedures of this Section 6(c), regardless of the manner in which such Independent Counsel was selected or appointed.

(d) In making a determination with respect to entitlement to indemnification hereunder, the person or persons or entity making such determination shall presume that Indemnitee is entitled to indemnification under this Agreement. Anyone seeking to overcome this presumption shall have the burden of proof and the burden of persuasion by clear and convincing evidence. Neither the failure of the Company (including by its directors or independent legal counsel) to have made a determination prior to the commencement of any action pursuant to this Agreement that indemnification is proper in the circumstances because Indemnitee has met the applicable standard of conduct, nor an actual determination by the Company (including by its directors or independent legal counsel) that Indemnitee has not met such applicable standard of conduct, shall be a defense to the action or create a presumption that Indemnitee has not met the applicable standard of conduct.

(e) Indemnitee shall be deemed to have acted in good faith if Indemnitee's action is based on the records or books of account of the Enterprise (as hereinafter defined), including financial statements, or on information supplied to Indemnitee by the officers of the Enterprise in the course of their duties, or on the advice of legal counsel for the Enterprise or on information or records given or reports made to the Enterprise by an independent certified public accountant or by an appraiser or other expert selected with reasonable care by the Enterprise. In addition, the knowledge and/or actions, or failure to act, of any director, officer,

agent or employee of the Enterprise shall not be imputed to Indemnitee for purposes of determining the right to indemnification under this Agreement. Whether or not the foregoing provisions of this Section 6(e) are satisfied, it shall in any event be presumed that Indemnitee has at all times acted in good faith and in a manner he reasonably believed to be in or not opposed to the best interests of the Company. Anyone seeking to overcome this presumption shall have the burden of proof and the burden of persuasion by clear and convincing evidence.

(f) If the person, persons or entity empowered or selected under Section 6 to determine whether Indemnitee is entitled to indemnification shall not have made a determination within sixty (60) days after the conclusion of the Proceeding giving rise to the request for indemnification, the requisite determination of entitlement to indemnification shall be deemed to have been made and Indemnitee shall be entitled to such indemnification absent (i) a misstatement by Indemnitee of a material fact, or an omission of a material fact necessary to make Indemnitee's statement not materially misleading, in connection with the request for indemnification, or (ii) a prohibition of such indemnification under applicable law; provided, however, that such sixty (60)-day period may be extended for a reasonable time, not to exceed an additional thirty (30) days, if the person, persons or entity making such determination with respect to entitlement to indemnification in good faith requires such additional time to obtain or evaluate documentation and/or information relating thereto; and provided, further, that the foregoing provisions of this Section 6(f) shall not apply if the determination of entitlement to indemnification is to be made by the stockholders pursuant to Section 6(b) of this Agreement and if (A) within fifteen (15) days after the conclusion of the Proceeding giving rise to the request for indemnification, the Board or the Disinterested Directors, if appropriate, resolve to submit such determination to the stockholders for their consideration at an annual meeting thereof to be held within seventy-five (75) days after such resolution and such determination is made thereat, or (B) a special meeting of stockholders is called within fifteen (15) days after such resolution and such meeting is held for such purpose within sixty (60) days after having been so called and such determination is made thereat.

(g) Indemnitee shall cooperate with the person, persons or entity making such determination with respect to Indemnitee's entitlement to indemnification, including providing to such person, persons or entity upon reasonable advance request any documentation or information which is not privileged or otherwise protected from disclosure and which is reasonably available to Indemnitee and reasonably necessary to such determination. Any Independent Counsel, member of the Board or stockholder of the Company shall act reasonably and in good faith in making a determination regarding the Indemnitee's entitlement to indemnification under this Agreement. Any costs or expenses (including attorneys' fees and disbursements) incurred by Indemnitee in so cooperating with the person, persons or entity making such determination shall be borne by the Company (irrespective of the determination as to Indemnitee's entitlement to indemnification) and the Company hereby indemnifies and agrees to hold Indemnitee harmless therefrom.

(h) The Company acknowledges that a settlement or other disposition short of final judgment may be successful if it permits a party to avoid expense, delay, distraction, disruption and uncertainty. In the event that any action, claim or proceeding to which Indemnitee is a party is resolved in any manner other than by adverse judgment against Indemnitee (including, without limitation, settlement of such action, claim or proceeding with or without payment of money or other consideration) it shall be presumed that Indemnitee has been successful on the merits or otherwise in such action, suit or proceeding. Anyone seeking to overcome this presumption shall have the burden of proof and the burden of persuasion by clear and convincing evidence.

(i) The termination of any Proceeding or of any claim, issue or matter therein, by judgment, order, settlement or conviction, or upon a plea of nolo contendere or its equivalent, shall not (except as otherwise expressly provided in this Agreement) of itself adversely affect the right of Indemnitee to indemnification or create a presumption that Indemnitee did not act in good faith and in a manner which he reasonably believed to be in or not opposed to the best interests of the Company or, with respect to any criminal Proceeding, that Indemnitee had reasonable cause to believe that his conduct was unlawful.

7. Remedies of Indemnitee.

(a) In the event that (i) a determination is made pursuant to Section 6 of this Agreement that Indemnitee is not entitled to indemnification under this Agreement, (ii) advancement of Expenses is not timely made pursuant to Section 5 of this Agreement, (iii) no determination of entitlement to indemnification is made pursuant to Section 6(b) of this Agreement within ninety (90) days after the conclusion of the Proceeding giving rise to the request for indemnification, (iv) payment of indemnification required by Section 4 is not made pursuant to this Agreement within thirty (30) days after receipt by the Company of a written request therefor or (v) payment of indemnification is not made within ten (10) days after a determination has been made that Indemnitee is entitled to indemnification or such determination is deemed to have been made pursuant to Section 6 of this Agreement, Indemnitee shall be entitled to an adjudication in Court of Chancery of the State of Delaware of Indemnitee's entitlement to such indemnification. Indemnitee shall commence such proceeding seeking an adjudication within one hundred eighty (180) days following the date on which Indemnitee first has the right to commence such proceeding pursuant to this Section 7(a). The Company shall not oppose Indemnitee's right to seek any such adjudication.

(b) In the event that a determination shall have been made pursuant to Section 6(b) of this Agreement that Indemnitee is not entitled to indemnification, any judicial proceeding commenced pursuant to this Section 7 shall be conducted in all respects as a de novo trial on the merits, and Indemnitee shall not be prejudiced by reason of the adverse determination under Section 6(b).

(c) If a determination shall have been made pursuant to Section 6(b) of this Agreement that Indemnitee is entitled to indemnification, the Company shall be bound by such determination in any judicial proceeding commenced pursuant to this Section 7, absent (i) a misstatement by Indemnitee of a material fact, or an omission of a material fact necessary to make Indemnitee's misstatement not materially misleading in connection with the application for indemnification, or (ii) a prohibition of such indemnification under applicable law.

(d) In the event that Indemnitee, pursuant to this Section 7, seeks a judicial adjudication of his rights under, or to recover damages for breach of, this Agreement, or to recover under any directors' and officers' liability insurance policies maintained by the Company, the Company shall pay on his behalf, in advance, any and all expenses (of the types described in the definition of Expenses in Section 13 of this Agreement) actually and reasonably incurred by him in such judicial adjudication, regardless of whether Indemnitee ultimately is determined to be entitled to such indemnification, advancement of expenses or insurance recovery.

(e) The Company shall be precluded from asserting in any judicial proceeding commenced pursuant to this Section 7 that the procedures and presumptions of this Agreement are not valid, binding and enforceable and shall stipulate in any such court that the Company is bound by all the provisions of this Agreement. The Company shall indemnify Indemnitee against any and all Expenses and, if requested by Indemnitee, shall (within ten (10) days after receipt by the Company of a written request therefore) advance, to the extent not prohibited by law, such expenses to Indemnitee, which are incurred by Indemnitee in connection with any action brought by Indemnitee for indemnification or advance of Expenses from the Company under this Agreement or under any directors' and officers' liability insurance policies maintained by the Company, regardless of whether Indemnitee ultimately is determined to be entitled to such indemnification, advancement of Expenses or insurance recovery, as the case may be.

(f) Notwithstanding anything in this Agreement to the contrary, no determination as to entitlement to indemnification under this Agreement shall be required to be made prior to the final disposition of the Proceeding.

8. Non-Exclusivity; Survival of Rights; Insurance; Primacy of Indemnification; Subrogation.

(a) The rights of indemnification as provided by this Agreement shall not be deemed exclusive of any other rights to which Indemnitee may at any time be entitled under applicable law, the Bylaws, any agreement, a vote of stockholders, a resolution of directors of the Company, or otherwise. No amendment, alteration or repeal of this Agreement or of any provision hereof shall limit or restrict any right of Indemnitee under this Agreement in respect of any action taken or omitted by such Indemnitee in his Corporate Status prior to such amendment, alteration or repeal. To the extent that a change in the DGCL, whether by statute or judicial decision, permits greater indemnification than would be afforded currently under the Bylaws and this Agreement, it is the intent of the parties hereto that Indemnitee shall enjoy by this Agreement the greater benefits so afforded by such change. No right or remedy herein conferred is intended to be exclusive of any other right or remedy, and every other right and remedy shall be cumulative and in addition to every other right and remedy given hereunder or now or hereafter existing at law or in equity or otherwise. The assertion or employment of any right or remedy hereunder, or otherwise, shall not prevent the concurrent assertion or employment of any other right or remedy.

(b) To the extent that the Company maintains an insurance policy or policies providing liability insurance for directors, officers, employees, or agents or fiduciaries of the Company or of any other corporation, partnership, joint venture, trust, employee benefit plan or other enterprise that such person serves at the request of the Company, Indemnitee shall be covered by such policy or policies in accordance with its or their terms to the maximum extent of the coverage available for any director, officer, employee, agent or fiduciary under such policy or policies. If, at the time of the receipt of a notice of a claim pursuant to the terms hereof, the Company has directors' and officers' liability insurance in effect, the Company shall give prompt notice of the commencement of such proceeding to the insurers in accordance with the procedures set forth in the respective policies. The Company shall thereafter take all necessary or desirable action to cause such insurers to pay, on behalf of the Indemnitee, all amounts payable as a result of such proceeding in accordance with the terms of such policies.

(c) [The Company hereby acknowledges that Indemnitee has certain rights to indemnification, advancement of expenses and/or insurance provided by [ ] and certain of its affiliates (collectively, the "***Fund Indemnitors***"). The Company hereby agrees (i) that it is the indemnitor of first resort (i.e., its obligations to Indemnitee are primary and any obligation of the Fund Indemnitors to advance expenses or to provide indemnification for the same expenses or liabilities incurred by Indemnitee are secondary), (ii) that it shall be required to advance the full amount of expenses incurred by Indemnitee and shall be liable for the full amount of all Expenses, judgments, penalties, fines and amounts paid in settlement to the extent legally permitted and as required by the terms of this Agreement and the Bylaws of the Company (or any other agreement between the Company and Indemnitee), without regard to any rights Indemnitee may have against the Fund Indemnitors, and, (iii) that it irrevocably waives, relinquishes and releases the Fund Indemnitors from any and all claims against the Fund Indemnitors for contribution, subrogation or any other recovery of any kind in respect thereof. The Company further agrees that no advancement or payment by the Fund Indemnitors on behalf of Indemnitee with respect to any claim for which Indemnitee has sought indemnification from the Company shall affect the foregoing and the Fund Indemnitors shall have a right of contribution and/or be subrogated to the extent of such advancement or payment to all of the rights of recovery of Indemnitee against the Company. The Company and Indemnitee agree that the Fund Indemnitors are express third party beneficiaries of the terms of this Section 8(c).]

(d) [Except as provided in paragraph (c) above,] in the event of any payment under this Agreement, the Company shall be subrogated to the extent of such payment to all of the rights of recovery of Indemnitee (other than against the Fund Indemnitors), who shall execute all papers required and take all action necessary to secure such rights, including execution of such documents as are necessary to enable the Company to bring suit to enforce such rights.

(e) [Except as provided in paragraph (c) above,] the Company shall not be liable under this Agreement to make any payment of amounts otherwise indemnifiable hereunder if and to the extent that Indemnitee has otherwise actually received such payment under any insurance policy, contract, agreement or otherwise.

(f) [Except as provided in paragraph (c) above,] the Company's obligation to indemnify or advance Expenses hereunder to Indemnitee who is or was serving at the request of the Company as a director, officer, employee or agent of any other corporation, partnership, joint venture, trust, employee benefit plan or other enterprise shall be reduced by any amount Indemnitee has actually received as indemnification or advancement of expenses from such other corporation, partnership, joint venture, trust, employee benefit plan or other enterprise.

9. Exception to Right of Indemnification. Notwithstanding any provision in this Agreement, the Company shall not be obligated under this Agreement to make any indemnity in connection with any claim made against Indemnitee:

(a) for which payment has actually been made to or on behalf of Indemnitee under any insurance policy or other indemnity provision, except with respect to any excess beyond the amount paid under any insurance policy or other indemnity provision[, provided, that the foregoing shall not affect the rights of Indemnitee or the Fund Indemnitors set forth in Section 8(c) above]; or

(b) for an accounting of profits made from the purchase and sale (or sale and purchase) by Indemnitee of securities of the Company within the meaning of Section 16(b) of the Securities Exchange Act of 1934, as amended, or similar provisions of state statutory law or common law; or

(c) in connection with any Proceeding (or any part of any Proceeding) initiated by Indemnitee, including any Proceeding (or any part of any Proceeding) initiated by Indemnitee against the Company or its directors, officers, employees or other indemnitees, unless (i) the Board authorized the Proceeding (or any part of any Proceeding) prior to its initiation or (ii) the Company provides the indemnification, in its sole discretion, pursuant to the powers vested in the Company under applicable law.

10. Duration of Agreement. All agreements and obligations of the Company contained herein shall continue during the period Indemnitee is an officer or director of the Company (or is or was serving at the request of the Company as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise) and shall continue thereafter so long as Indemnitee shall be subject to any Proceeding (or any proceeding commenced under Section 7 hereof) by reason of his Corporate Status, whether or not he is acting or serving in any such capacity at the time any liability or expense is incurred for which indemnification can be provided under this Agreement. This Agreement shall be binding upon and inure to the benefit of and be enforceable by the parties hereto and their respective successors (including any direct or indirect successor by purchase, merger, consolidation or otherwise to all or substantially all of the business or assets of the Company), assigns, spouses, heirs, executors and personal and legal representatives.

11. Security. To the extent requested by Indemnitee and approved by the Board, the Company may at any time and from time to time provide security to Indemnitee for the Company's obligations hereunder through an irrevocable bank line of credit, funded trust or other collateral. Any such security, once provided to Indemnitee, may not be revoked or released without the prior written consent of the Indemnitee.

12. Enforcement.

(a) The Company expressly confirms and agrees that it has entered into this Agreement and assumes the obligations imposed on it hereby in order to induce Indemnitee to serve as an officer or director of the Company, and the Company acknowledges that Indemnitee is relying upon this Agreement in serving as an officer or director of the Company.

(b) This Agreement constitutes the entire agreement between the parties hereto with respect to the subject matter hereof and supersedes all prior agreements and understandings, oral, written and implied, between the parties hereto with respect to the subject matter hereof.

(c) The Company shall not seek from a court, or agree to, a "bar order" which would have the effect of prohibiting or limiting the Indemnitee's rights to receive advancement of expenses under this Agreement.

13. Definitions. For purposes of this Agreement:

(a) "***Corporate Status***" describes the status of a person who is or was a director, officer, employee, agent or fiduciary of the Company or of any other corporation, partnership, joint venture, trust, employee benefit plan or other enterprise that such person is or was serving at the express written request of the Company.

(b) "***Disinterested Director***" means a director of the Company who is not and was not a party to the Proceeding in respect of which indemnification is sought by Indemnitee.

(c) "***Enterprise***" shall mean the Company and any other corporation, partnership, joint venture, trust, employee benefit plan or other enterprise that Indemnitee is or was serving at the express written request of the Company as a director, officer, employee, agent or fiduciary.

(d) "***Expenses***" shall include all reasonable attorneys' fees, retainers, court costs, transcript costs, fees of experts, witness fees, travel expenses, duplicating costs, printing and binding costs, telephone charges, postage, delivery service fees and all other disbursements or expenses of the types customarily incurred in connection with prosecuting, defending, preparing to prosecute or defend, investigating, participating, or being or preparing to be a witness in a Proceeding, or responding to, or objecting to, a request to provide discovery in any Proceeding. Expenses also shall include Expenses incurred in connection with any appeal resulting from any Proceeding and any federal, state, local or foreign taxes imposed on the Indemnitee as a result of the actual or deemed receipt of any payments under this Agreement, including without limitation the premium, security for, and other costs relating to any cost bond, supersede as bond, or other appeal bond or its equivalent. Expenses, however, shall not include amounts paid in settlement by Indemnitee or the amount of judgments or fines against Indemnitee.

(e) "***Independent Counsel***" means a law firm, or a member of a law firm, that is experienced in matters of corporation law and neither presently is, nor in the past five years has been, retained to represent: (i) the Company or Indemnitee in any matter material to either such party (other than with respect to matters concerning Indemnitee under this Agreement, or of other indemnitees under similar indemnification agreements), or (ii) any other party to the Proceeding giving rise to a claim for indemnification hereunder. Notwithstanding the foregoing, the term "Independent Counsel" shall not include any person who, under the applicable standards of professional conduct then prevailing, would have a conflict of interest in representing either the Company or Indemnitee in an action to determine Indemnitee's rights under this Agreement. The Company agrees to pay the reasonable fees of the Independent Counsel referred to above and to fully indemnify such counsel against any and all Expenses, claims, liabilities and damages arising out of or relating to this Agreement or its engagement pursuant hereto.

(f) "***Proceeding***" includes any threatened, pending or completed action, suit, arbitration, alternate dispute resolution mechanism, investigation, inquiry, administrative hearing or any other actual, threatened or completed proceeding, whether brought by or in the right of the Company or otherwise and whether civil, criminal, administrative or investigative, in which Indemnitee was, is or will be involved as a party or otherwise, by reason of his or her Corporate Status, by reason of any action taken by him or of any inaction on his part while acting in his or her Corporate Status; in each case whether or not he is acting or serving in any such capacity at the time any liability or expense is incurred for which indemnification can be provided under this Agreement; including one pending on or before the date of this Agreement, but excluding one initiated by an Indemnitee pursuant to Section 7 of this Agreement to enforce his rights under this Agreement.

14. Severability. The invalidity or unenforceability of any provision hereof shall in no way affect the validity or enforceability of any other provision. Further, the invalidity or unenforceability of any provision hereof as to either Indemnitee or Appointing Stockholder shall in no way affect the validity or enforceability of any provision hereof as to the other. Without limiting the generality of the foregoing, this Agreement is intended to confer upon Indemnitee and Appointing Stockholder indemnification rights to the fullest extent permitted by applicable laws. In the event any provision hereof conflicts with any applicable law, such provision shall be deemed modified, consistent with the aforementioned intent, to the extent necessary to resolve such conflict.

15. Modification and Waiver. No supplement, modification, termination or amendment of this Agreement shall be binding unless executed in writing by both of the parties hereto. No waiver of any of the provisions of this Agreement shall be deemed or shall constitute a waiver of any other provisions hereof (whether or not similar) nor shall such waiver constitute a continuing waiver.

16. Notice By Indemnitee. Indemnitee agrees promptly to notify the Company in writing upon being served with or otherwise receiving any summons, citation, subpoena, complaint, indictment, information or other document relating to any Proceeding or matter which may be subject to indemnification covered hereunder. The failure to so notify the Company shall not relieve the Company of any obligation which it may have to Indemnitee under this Agreement or otherwise unless and only to the extent that such failure or delay materially prejudices the Company.

17. Notices. All notices and other communications given or made pursuant to this Agreement shall be in writing and shall be deemed effectively given: (a) upon personal delivery to the party to be notified, (b) when sent by confirmed electronic mail or facsimile if sent during normal business hours of the recipient, and if not so confirmed, then on the next business day, (c) five (5) days after having been sent by registered or certified mail, return receipt requested, postage prepaid, or (d) one (1) day after deposit with a nationally recognized overnight courier, specifying next day delivery, with written verification of receipt. All communications shall be sent:

(a) To Indemnitee at the address set forth below Indemnitee signature hereto.

(b) To the Company at:

Precision BioSciences, Inc.
302 East Pettigrew St. Suite A-100
Durham, North Carolina 27701
Attention: Chief Executive Officer

or to such other address as may have been furnished to Indemnitee by the Company or to the Company by Indemnitee, as the case may be.

18. Counterparts. This Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Counterparts may be delivered via facsimile, electronic mail (including pdf or any electronic signature complying with the U.S. federal ESIGN Act of 2000, *e.g.*, www.docusign.com) or any other transmission method and any counterpart so delivered shall be deemed to have been duly and validly delivered and be valid and effective for all purposes.

19. Headings. The headings of the paragraphs of this Agreement are inserted for convenience only and shall not be deemed to constitute part of this Agreement or to affect the construction thereof.

20. Governing Law and Consent to Jurisdiction. This Agreement and the legal relations among the parties shall be governed by, and construed and enforced in accordance with, the laws of the State of Delaware, without regard to its conflict of laws rules. The Company and Indemnitee hereby irrevocably and unconditionally (i) agree that any action or proceeding arising out of or in connection with this Agreement shall be brought only in the Chancery Court of the State of Delaware (the "***Delaware Court***"), and not in any other state or federal court in the United States of America or any court in any other country, (ii) consent to submit to the exclusive jurisdiction of the Delaware Court for purposes of any action or proceeding arising out of or in connection with this Agreement, (iii) appoint, to the extent such party is not otherwise subject to service of process in the State of Delaware, irrevocably CT Corporation System, 111 Eighth Avenue, New York, NY 10011 as its agent in the State of Delaware as such party's agent for acceptance of legal process in connection with any such action or proceeding against such party with the same legal force and validity as if served upon such party personally within the State of Delaware, (iv) waive any objection to the laying of venue of any such action or proceeding in the Delaware Court, and (v) waive, and agree not to plead or to make, any claim that any such action or proceeding brought in the Delaware Court has been brought in an improper or inconvenient forum.

SIGNATURE PAGE TO FOLLOW

IN WITNESS WHEREOF, the parties hereto have executed this Indemnification Agreement on and as of the day and year first above written.

PRECISION BIOSCIENCES, INC.

By: _____

Name: _____

Title: _____

INDEMNITEE

_____

Name: _____

Address:

_____

_____

_____

_____

PRECISION BIOSCIENCES, INC.

NON-EMPLOYEE DIRECTOR COMPENSATION PROGRAM

Non-employee members of the board of directors (the "***Board***") of Precision BioSciences, Inc. (the "***Company***") shall receive cash and equity compensation as set forth in this Non-Employee Director Compensation Program (this "***Program***"). The cash and equity compensation described in this Program shall be paid or be made, as applicable, automatically and without further action of the Board, to each member of the Board who is not an employee of the Company or any parent or subsidiary of the Company (each, a "***Non-Employee Director***") who is entitled to receive such cash or equity compensation, unless such Non-Employee Director declines the receipt of such cash or equity compensation by written notice to the Company. This Program shall remain in effect until it is revised or rescinded by further action of the Board. This Program may be amended, modified or terminated by the Board at any time in its sole discretion. The terms and conditions of this Program shall supersede any prior cash and/or equity compensation arrangements for service as a member of the Board between the Company and any of its Non-Employee Directors, except for equity compensation previously granted to a Non-Employee Director. This Program shall become effective on the date of the effectiveness of the Company's Registration Statement on Form S-1 relating to the initial public offering of common stock (the "***Effective Date***").

CASH COMPENSATION

The schedule of annual retainers (the "***Annual Retainers***") for the Non-Employee Directors is as follows:

Position	Amount
Base Board Fee	$40,000
Chair of Audit Committee	$15,000
Chair of Compensation Committee	$12,250
Chair of Nominating and Corporate Governance Committee	$ 8,250
Member of Audit Committee (non-Chair)	$ 7,500
Member of Compensation Committee (non-Chair)	$ 6,000
Member of Nominating and Corporate Governance Committee (non-Chair)	$ 4,500

For the avoidance of doubt, the Annual Retainers in the table above are additive and a Non-Employee Director shall be eligible to earn an Annual Retainer for each position in which he or she serves. The Annual Retainers shall be earned on a quarterly basis based on a calendar quarter and shall be paid in cash by the Company in arrears not later than the fifteenth day following the end of each calendar quarter. In the event a Non-Employee Director does not serve as a Non-Employee Director, or in the applicable position, for an entire calendar quarter, the retainer paid to such Non-Employee Director shall be prorated for the portion of such calendar quarter actually served as a Non-Employee Director, or in such position, as applicable. In addition, the Annual Retainers will be prorated for the first calendar quarter in which the Effective Date occurs, which proration will be based on the number of days of the calendar quarter remaining in such quarter after the Effective Date.

EQUITY COMPENSATION

Each Non-Employee Director shall be granted options to purchase the Company's common stock (each, an "***Option***") having an aggregate Grant Date Fair Value (as defined below) as set forth in the following table, with any partial shares that result being rounded down to the nearest whole share. Each Option shall be granted under and subject to the terms and provisions of the Company's 2019 Incentive Award Plan or any other applicable Company equity incentive plan then-maintained by the Company (the "***Equity Plan***") and shall be subject to an award agreement, including attached exhibits, in substantially the form previously approved by the Board. "***Grant Date Fair Value***" shall mean, with respect to an Option, the per share fair value of the Option determined as of the Option's date of grant using the Black-Scholes option pricing model that the Company most recently used in preparing its (audited or unaudited) consolidated financial statements that have been filed with the Securities Exchange Commission ("***Financial Statements***") and using as inputs into such model (i) the Fair Market Value of a share of the Company's common stock on the Option's date of grant and (ii) such other assumptions as were reported by the Company in the Financial Statements for the most recent period covered by the Financial Statements (and if any such assumptions were reported as a range of values, using the arithmetic mean of the reported values).

Option	Grant Date Fair Value
Initial Option	$ 350,000
Subsequent Option	$ 175,000

A. Initial Options. Each Non-Employee Director who is initially elected or appointed to the Board after the Effective Date shall receive the Initial Option on the date of such initial election or appointment. No Non-Employee Director shall be granted more than one Initial Option.

B. Subsequent Options. A Non-Employee Director who (i) served as a Non-Employee Director on the Effective Date or has been serving as a Non-Employee Director on the Board for at least six months as of the date of any annual meeting of the Company's stockholders after the Effective Date and (ii) will continue to serve as a Non-Employee Director immediately following such meeting, shall be automatically granted a Subsequent Option on the date of such annual meeting. For the avoidance of doubt, a Non-Employee Director elected for the first time to the Board at an annual meeting of the Company's stockholders shall only receive an Initial Award in connection with such election, and shall not receive any Subsequent Award on the date of such meeting as well.

C. Termination of Employment of Employee Directors. Members of the Board who are employees of the Company or any parent or subsidiary of the Company who subsequently terminate their employment with the Company and any parent or subsidiary of the Company and remain on the Board will not receive an Initial Option, but to the extent that they are otherwise entitled, will receive, after termination of employment with the Company and any parent or subsidiary of the Company, Subsequent Options.

D. Terms of Options Granted to Non-Employee Directors.

1. *Exercise Price*. The per-share exercise price of each Option granted to a Non-Employee Director shall equal the Fair Market Value (as defined in the Equity Plan) of a share of the Company's common stock on the date the Option is granted.

2. *Vesting*.

a. Initial Options. Each Initial Option shall vest and become exercisable in thirty-six (36) substantially equal monthly installments following the date of grant, such that the Initial Option shall be fully vested on the third anniversary of the date of grant, subject to the Non-Employee Director continuing in service as a Non-Employee Director through each such vesting date.

b. *Subsequent Options*. Each Subsequent Option shall vest and become exercisable on the earlier of the first anniversary of the date of grant or the day immediately prior to the date of the next annual meeting of the Company's stockholders occurring after the date of grant, in either case, subject to the Non-Employee Director continuing in service as a Non-Employee Director through such vesting date.

c. *Forfeiture of Options*. Unless the Board otherwise determines, any portion of an Initial Option or Subsequent Option which is unvested or unexercisable at the time of a Non-Employee Director's termination of service on the Board as a Non-Employee Director shall be immediately forfeited upon such termination of service and shall not thereafter become vested and exercisable. All of a Non-Employee Director's Initial Options and Subsequent Options shall vest in full immediately prior to the occurrence of a Change in Control (as defined in the Equity Plan), to the extent outstanding at such time.

3. *Term*. The maximum term of each Option granted to a Non-Employee Director hereunder shall be ten (10) years from the date the Option is granted.

Notwithstanding anything in this Program to the contrary, the sum of any cash compensation, or other compensation, and the value (determined as of the grant date in accordance with Financial Accounting Standards Board Accounting Standards Codification Topic 718, or any successor

thereto) of Options granted to a Non-Employee Director as compensation for services as a Non-Employee Director during any fiscal year of the Company may not exceed $750,000 (the "***NED Limit***"). The NED Limit shall be applied to reduce compensation in the following order: (A) reduction in any Initial Option granted during such year; (B) reduction in any Subsequent Option granted during such year; (C) reduction on a pro-rata basis of any cash or other compensation, payments or benefits that are exempt from Section 409A of the Internal Revenue Code of 1986, as amended ("***Section 409A***") and (D) reduction of any cash or other compensation, payments or benefits otherwise payable to the Non-Employee Director on a pro-rata basis or such other manner that complies with Section 409A. The Board may make exceptions to the NED Limit in extraordinary circumstances, as the Board may determine in its discretion, provided that the Non-Employee Director receiving such additional compensation may not participate in the decision to award such compensation or in other contemporaneous compensation decisions involving Non-Employee Directors.

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Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the use in this Amendment No. 2 to the Registration Statement on Form S-1 No. 333-230034 of our report dated February 21, 2019 (March 18, 2019 as to Note 15) relating to the financial statements of Precision BioSciences, Inc., appearing in the Prospectus, which is part of this Registration Statement, and to the reference to us under the headings “Experts” in such Prospectus.

/s/ Deloitte & Touche LLP

Raleigh, North Carolina
March 18, 2019