Table of Contents

Filed pursuant to Rule 424(b)(4)
Registration No. 333-223414

PROSPECTUS

5,770,000 Shares

Common Stock

Unum Therapeutics Inc. is offering 5,770,000 shares of its common stock. This is our initial public offering and no public market exists for our common stock. The initial public offering price per share of our common stock is $12.00.

Our common stock has been approved for listing on The Nasdaq Global Select Market under the symbol "UMRX."

We are an "emerging growth company" as that term is used in the Jumpstart Our Business Startups Act of 2012 (JOBS Act), and, as such, we have elected to comply with certain reduced public company reporting requirements for this prospectus and future filings. See "Prospectus Summary—Implications of Being an Emerging Growth Company."

Investing in our common stock involves risks. See "Risk Factors" beginning on page 12.

	Price to Public	Underwriting Discounts and Commissions(1)	Proceeds to Unum Therapeutics Inc. (Before Expenses)
Per Share	*$12.00*	*$0.84*	*$11.16*
Total	*$69,240,000*	*$4,846,800*	*$64,393,200*

(1) See "Underwriters" beginning on page 167 of this prospectus for additional information regarding underwriting compensation.

Certain of our existing stockholders, including affiliates of our directors, have agreed to purchase an aggregate of approximately $27.1 million of shares of our common stock in this offering at the initial public offering price. The underwriters will receive the same underwriting discount on any shares purchased by these stockholders as they will on any other shares sold to the public in this offering.

We have granted the underwriters an option to purchase up to 865,500 additional shares of our common stock to cover over allotments. The underwriters can exercise this option at any time within 30 days after the date of this prospectus.

Seattle Genetics, Inc. has agreed to purchase from us, concurrently with this offering in a private placement, $5.0 million of shares of our common stock at a price per share equal to the initial public offering price. The shares of common stock purchased in the concurrent private placement will not be subject to any underwriting discounts or commissions. See "Concurrent Private Placement."

The underwriters expect to deliver the shares of our common stock to purchasers on or about April 3, 2018.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

MORGAN STANLEY *COWEN*

SUNTRUST ROBINSON HUMPHREY *WEDBUSH PACGROW*

March 28, 2018

TABLE OF CONTENTS

Through and including April 22, 2018 (25 days after the date of this prospectus), all dealers effecting transactions in these securities, whether or not participating in this offering, may be required to deliver a prospectus. This delivery requirement is in addition to the obligation of dealers to deliver a prospectus when acting as underwriters and with respect to their unsold allotments or subscriptions.

You should rely only on the information contained in this prospectus or in any free writing prospectus we file with the Securities and Exchange Commission. Neither we nor the underwriters have authorized anyone to provide you with information other than that contained in this prospectus or 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. We and the underwriters are offering to sell, and seeking offers to buy, common stock only in jurisdictions where offers and sales are permitted. The information contained in this prospectus is accurate only as of the date on the front cover page of this prospectus, or other earlier date stated in this prospectus, regardless of the time of delivery of this prospectus or of any sale of our common stock.

The market data and certain other statistical information used throughout this prospectus are based on independent industry publications, governmental publications, reports by market research firms, or other independent sources that we believe to be reliable sources. Although we believe that these sources are reliable, we have not independently verified the information contained in such publications. While we are not aware of any misstatements regarding any third-party information presented in this prospectus, their estimates, in particular, as they relate to projections, involve numerous assumptions, are subject to risks and uncertainties, and are subject to change based on various factors, including those discussed under the section titled "Risk Factors" and elsewhere in this prospectus. Some data are also based on our good faith estimates.

PROSPECTUS SUMMARY

This summary highlights information contained elsewhere in this prospectus and does not contain all of the information that you should consider in making your investment decision. Before investing in our common stock, you should carefully read this entire prospectus, including our consolidated financial statements and the related notes included elsewhere in this prospectus. You should also consider, among other things, the matters described under "Risk Factors," "Business," and "Management's Discussion and Analysis of Financial Condition and Results of Operations," in each case appearing elsewhere in this prospectus. Unless the context otherwise requires, we use the terms "Unum," "company," "we," "us," and "our" in this prospectus to refer to Unum Therapeutics Inc. and, where appropriate, our subsidiary.

Overview

We are a clinical-stage biopharmaceutical company focused on the development and commercialization of novel immunotherapy products designed to harness the power of a patient's immune system to cure cancer. Our proprietary technology, called antibody-coupled T cell receptor (ACTR), is a universal, engineered cell therapy that is intended to be used in combination with a wide range of tumor-specific antibodies to target different tumor types. Our product candidates are composed of ACTR T cells co-administered with approved and commercially available antibodies or antibodies in preclinical or clinical development. Our vision is to use our ACTR platform to transform cancer treatment and deliver patient cures in many different hematologic and solid tumor cancers, improving upon current cell therapies.

In our ongoing Phase I clinical trial using our lead ACTR construct, ACTR087, to treat adult patients with relapsed or refractory non-Hodgkin lymphoma (r/r NHL), we have demonstrated clinical proof of concept, as evidenced by ACTR T cell expansion and persistence, a favorable tolerability profile at the first dose level, and anti-tumor activity. We recently completed patient enrollment into the dose escalation phase of this trial and are advancing towards testing in an expanded patient cohort using an optimized dose of ACTR087 to support potential registration trials.

Our pipeline also includes two additional product candidates in clinical testing. We have commenced a Phase I clinical trial of ACTR707, a modified ACTR construct, used in combination with rituximab in adult patients with r/r NHL and a Phase I clinical trial of ACTR087 used in combination with the novel antibody SEA-BCMA in adult patients with r/r multiple myeloma. Further, we expect to file an investigational new drug application (IND) in 2018 for ACTR707 used in combination with trastuzumab, an FDA-approved antibody, to treat patients with solid tumor cancers that overexpress the human epidermal growth factor receptor 2 (HER2+ cancers). In the longer term, we aim to leverage our ACTR platform to develop a broad range of product candidates to address many different hematologic and solid tumor cancers.

Immuno-oncology, the use of a patient's immune system to treat cancer, is one of the most actively pursued areas of research in drug discovery and development. Adoptive cell therapies are one immuno-oncology approach for cancer treatment. Adoptive cell therapy starts with the isolation of immune cells from a patient, followed by genetic modification of these cells outside the patient's body. Modified cells are then re-introduced into the patient to treat disease. Chimeric antigen receptor (CAR)-T cells are one type of adoptive cell therapy. While CAR-T's efficacy in hematologic cancers has been impressive, limited clinical data have been reported on the use of CAR-Ts in solid tumor cancers and the results have been much less encouraging than in the hematologic cancer setting. Severe side effects, such as cytokine release syndrome (CRS) and neurotoxicity, have been observed in some patients. For certain CARs, on-target, off-tumor effects have led to patient deaths. These toxicities and specific solid tumor challenges create a need to better control the activity of these therapies.

Our product candidates use patient-derived T cells, which are genetically modified to express the ACTR protein and co-administered with a tumor-specific antibody. ACTR is a chimeric protein which combines

components from proteins normally found on both T cells and natural killer cells, two types of human immune cells. The natural killer cell component enables binding to tumor cell-bound antibodies and the T cell component enables potent cytotoxicity, proliferation, and persistence. Tumor-targeting antibodies administered with ACTR T cells bind to the surface of the tumor cell and, in effect, label it for ACTR T cell attack. When an ACTR T cell encounters a tumor cell bound with antibodies, it binds to those antibodies and kills the tumor cell through a process known as antibody-dependent cellular cytotoxicity (ADCC), a function not normally observed with T cells. No special modification of the tumor-specific antibody is required in order for ADCC to take place.

ACTR T cells can be directed to a wide range of different cancer cell antigens through the co-administration of antigen-specific antibodies. Thus, we believe an ACTR T cell can be used in many different cancer types. Preclinical data from in vivo testing show that ACTR T cell-mediated tumor killing activity may be adjusted by modulating the dose of the targeting antibodies. This ability to adjust ACTR T cell activity could make it possible to define an optimal dose through clinical testing to maximize tumor-killing activity and minimize toxicity.

We have a broad product pipeline that includes three clinical stage product candidates:

- Our most advanced product candidate, ACTR087 used in combination with rituximab, is being tested in adult patients with r/r NHL in an ongoing Phase I clinical trial called ATTCK-20-2. Two dose levels were explored in the dose escalation phase of this trial. Expansion and persistence of ACTR T cells was observed in all patients evaluable for response in both tested dose levels for as long as monitoring continued, consistent with what has been observed in CAR-T trials. At the first dose level of this trial, seven patients were treated with ACTR087 used in combination with rituximab and six patients were evaluable for response. Of the six evaluable patients, two complete responses and one partial response were observed. As of March 7, 2018, one of the complete responses was ongoing. No adverse events commonly associated with T cell activation (CRS or neurotoxicity) of any grade were observed. At the second dose level of this trial, nine patients were treated with ACTR087 used in combination with rituximab (a tenth patient was treated at the first dose level due to patient cell production limitations). Six of these patients were evaluable for response at the 42-day follow-up as of March 7, 2018. Three partial responses have thus far been observed, one of which was ongoing as of March 7, 2018. We also observed dose-limiting toxicities in three patients within this cohort and concluded that under this treatment regimen, the second dose level exceeds the maximum tolerated dose. We recently completed patient enrollment into the dose escalation phase of this trial and are advancing towards testing in an expanded patient cohort using an optimized dose of ACTR087 to support potential registration trials. We plan to report preliminary data from this expansion cohort at the end of 2018. In parallel with this ongoing Phase I clinical trial, we plan to initiate a Phase II clinical trial exploring ACTR087 used in combination with rituximab in adult patients with r/r NHL who received prior CD19 CAR-T therapy.
- Our second clinical stage product candidate, ACTR707 used in combination with rituximab, is being tested in adult patients with r/r NHL in a Phase I, multi-center, open-label clinical trial called ATTCK-20-03. ACTR707 is a modified ACTR construct designed to generate a more potent and sustained immune response to overcome immunosuppressive tumor microenvironments commonly found in solid tumor cancers. ACTR707 demonstrated activity against both hematologic and solid tumor cancers in preclinical studies. We are currently enrolling and dosing patients, and we expect to report initial data from the clinical trial in the fourth quarter of 2018. We plan to continue enrolling patients in this trial into 2019. We expect to leverage data from the Phase I clinical trial in future studies by combining ACTR707 with a variety of antibodies targeting different cancers.
- Our third clinical stage product candidate, ACTR087 used in combination with SEA-BCMA, is the first product candidate resulting from our strategic collaboration with Seattle Genetics, Inc. (Seattle Genetics). We are currently enrolling and dosing adult patients with r/r multiple myeloma in a Phase I multi-center trial and we expect to report initial data from this trial in the fourth quarter of 2018.

- ACTR707 used in combination with trastuzumab is currently in late preclinical development as a potential treatment for HER2+ solid tumor cancers. We plan to file an IND and initiate clinical testing of ACTR707 used in combination with trastuzumab in 2018.

Our Pipeline

The following table summarizes our product candidate pipeline:

Product Candidate	Indication	Clinical Phase	Last Event	Next Expected Event
ACTR087+rituximab	r/r B cell non-Hodgkin lymphoma	Phase I	Completion of dose escalation	Initiation of cohort expansion
	r/r B cell non-Hodgkin lymphoma, patients who received prior CD19 CAR-T therapy			Initiation of Phase II trial
ACTR707+rituximab	r/r B cell non-Hodgkin lymphoma	Phase I	Initiated Phase I dose escalation	Interim safety and efficacy data
ACTR087+SEA-BCMA *(collaboration with Seattle Genetics)*	r/r multiple myeloma	Phase I	Initiated Phase I dose escalation	Interim safety and efficacy data
ACTR707+trastuzumab	HER2+ cancers	Preclinical	Initiated non-clinical studies to support IND filing	IND filing

We have obtained and retained worldwide commercial rights to the majority of our product candidates, including our lead product candidate, ACTR087 used in combination with rituximab. We intend to establish our own commercial organization in the United States where we believe we can address physicians with a direct specialty sales force. Our commercial strategy for markets outside the United States may include the use of strategic partners or the establishment of our own commercial infrastructure. We plan to further evaluate these alternatives as we approach potential approval of our product candidates.

In June 2015, we announced a global strategic collaboration with Seattle Genetics to identify, research, develop, and commercialize two novel antibody-coupled ACTR therapies incorporating Seattle Genetics' proprietary antibodies. Under the terms of the collaboration, we will conduct preclinical research and clinical development activities through Phase I clinical trials and Seattle Genetics will provide all of the funding for those activities. We plan to work together to co-develop and fund product candidates after Phase I clinical trials. We will co-commercialize any successfully developed product candidates and share equally any profits and losses on any co-developed product candidates in the United States. Seattle Genetics retains exclusive commercial rights outside of the United States. The first product candidate under our collaboration is ACTR087 used in combination with Seattle Genetics' SEA-BCMA antibody for r/r multiple myeloma.

Clinical development and commercialization of ACTR products are supported by our efforts to optimize manufacturing from the initial collection of a patient's white blood cells through the re-infusion of a formulated ACTR T cell product (i.e., from "vein-to-vein"). To this end, we have developed a largely automated ACTR manufacturing process with quality, scalability, cost, and consistency in mind. We are currently addressing clinical manufacturing needs for both viral vector and ACTR T cells with contract manufacturing organizations (CMOs) to increase flexibility and mitigate risks. As our product candidates advance through clinical trials, we expect to secure commercial manufacturing capacity using one or more CMOs or by establishing our own commercial manufacturing good manufacturing practices (GMP) facility.

We believe that the quality of our people has a strong and positive impact on our ability to develop and capitalize on our ACTR platform. We have assembled a team of highly skilled and experienced employees, directors, scientific advisors, and consultants with broad capabilities in oncology drug discovery and

development. In addition, our scientific founder and an inventor of our key patents relating to ACTR087, Dario Campana, M.D., Ph.D., is considered a world leader in cancer cell therapy. Dr. Campana continues to support our efforts as Chair of our Scientific Advisory Board.

Our Strategy

Our goal is to transform cancer treatment through the application of our universal ACTR platform in a wide range of hematologic and solid tumor cancers. Key elements of our strategy include the following objectives:

- ***Expedite clinical development, regulatory approval, and commercialization of our product candidate ACTR087 used in combination with rituximab.*** We plan to continue to advance our lead product candidate, ACTR087 used in combination with rituximab, for the treatment of adult patients with r/r NHL. If we believe the Phase I data are compelling, we plan to discuss with the FDA the potential to move to a registration trial in adult patients with r/r NHL upon completion of the current Phase I clinical trial. Additionally, we plan to submit regulatory filings to enable a Phase II clinical trial in 2018 to evaluate ACTR087 used in combination with rituximab in adult patients with r/r NHL who received prior CD19 CAR-T therapy.
- ***Leverage our universal ACTR platform to broaden our product portfolio rapidly and cost effectively.*** ACTR is an investigational engineered cell therapy that we believe can be used in combination with a wide range of tumor-targeting antibodies to pursue different antigens and cancer indications. ACTR does not need to be modified for use with different antibodies, and antibodies do not need to be modified for use with ACTR. This allows us to leverage our investment in ACTR and the investment by third parties in existing antibodies across different ACTR–antibody combinations, tumor types, and indications. We expect the universality of our ACTR platform will allow us to prosecute four product candidates by the end of 2018.
- ***Expand our pipeline with increased focus on solid tumor product candidates***. With a particular aim at creating an ACTR that addresses the specific challenges associated with attacking solid tumor cancers, we have developed a modified ACTR construct called ACTR707. We plan to use ACTR707 to rapidly progress ACTR product candidates targeting solid tumor cancers into clinical development, starting with ACTR707 used in combination with trastuzumab for HER2+ cancers. We aim to continue to improve the functionality of the ACTR T cell in solid tumor cancers through (i) additional genetic modifications to exploit new supporting biology in the tumor microenvironment and (ii) introducing new manufacturing process modifications.
- ***Establish manufacturing capacity and leverage our process development capabilities to create a competitive advantage in T cell manufacturing.*** We designed a process using a closed automated system to support our clinical development plans and have devoted significant resources to optimizing process development. We currently engage CMOs to use our process for production of GMP material. In the future, we intend to establish our own GMP manufacturing facility.
- ***Establish commercialization and marketing capabilities to support current and future product candidates.*** We plan to establish a U.S.-focused specialty sales and marketing organization in advance of receipt of regulatory approval of the first ACTR product candidate. We intend to leverage the infrastructure developed for our first approved ACTR product to facilitate commercialization of any additional product candidates for which we gain approval. In addition, we will build upon physician familiarity and experience with the first approved ACTR product to accelerate adoption of subsequent products.

Risks Associated with Our Business

Our ability to implement our business strategy is subject to numerous risks, as more fully described in the section entitled "Risk Factors" immediately following this prospectus summary. These risks include, among others:

- We have incurred net losses in every year since our inception and anticipate that we will continue to incur net losses in the future. If we fail to obtain additional financing, we may be unable to complete the development and commercialization of our product candidates.
- Since the number of patients that we have dosed, or plan to dose, in our ongoing or planned Phase I clinical trials is small, the results from such clinical trials, once completed, may be less reliable than results achieved in larger clinical trials, which may hinder our efforts to obtain regulatory approval for our product candidates.
- Our product candidates may cause undesirable side effects or have other properties that could halt their clinical development, prevent their regulatory approval, require expansion of the trial size, limit their commercial potential, or result in significant negative consequences. For example, in the second dose level of our ongoing Phase I clinical trial called ATTCK-20-2, we have observed ACTR087-related serious adverse events (SAEs), including two patient deaths. We also experienced one non-ACTR087-related death that followed an ACTR087-related severe CRS. These events resulted in the FDA placing the trial on clinical hold pending submission of certain information relating to the ATTCK-20-2 clinical trial. The clinical hold was removed in February 2018, following review of this information by the FDA. However, if we continue to observe severe side effects in our clinical trials, such trials may be halted or put on an additional clinical hold prior to completion if there is determined to be an unacceptable safety risk for patients.
- Our clinical trials may fail to demonstrate adequately the safety and efficacy of any of our product candidates, which would prevent or delay regulatory approval and commercialization. The FDA regulatory approval process is lengthy and time-consuming, and we may experience significant delays in the clinical development and regulatory approval of our product candidates.
- Our business is highly dependent on the success of ACTR087 used in combination with rituximab or ACTR707 used in combination with rituximab, our lead product candidates, and other ACTR-antibody combinations that we may develop.
- Our ACTR T cell product candidates represent a novel approach to cancer treatment, which creates significant challenges for us.
- We have entered into a strategic collaboration with Seattle Genetics and may form or seek collaborations or strategic alliances or enter into additional licensing arrangements in the future, and we may not realize the benefits of such alliances or licensing arrangements.
- We face significant competition from other biotechnology and pharmaceutical companies, and our operating results will suffer if we fail to compete effectively.
- We rely and will rely on third parties to conduct our clinical trials. If these third parties do not properly and successfully carry out their contractual duties or meet expected deadlines, we may not be able to obtain regulatory approval of or commercialize our product candidates. We expect to rely on third parties to manufacture our clinical product supplies, and we may rely on third parties for at least a portion of the manufacturing process of our product candidates, if approved. Our business could be harmed if those third parties fail to provide us with sufficient quantities of clinical product supplies or product candidates or fail to do so at acceptable quality levels or prices.
- We depend on intellectual property licensed from third parties and termination of any of these licenses could result in the loss of significant rights, which would harm our business.

Concurrent Private Placement

Seattle Genetics has agreed to purchase from us, concurrently with this offering in a private placement, $5.0 million of shares of our common stock at a price per share equal to the initial public offering price. See "Concurrent Private Placement."

Corporate History

We were incorporated under the laws of the State of Delaware in March 2014. Our principal executive office is located at 200 Cambridge Park Drive, Suite 3100, Cambridge, Massachusetts 02140, and our telephone number is (617) 945-5576. Our website address is www.unumrx.com. We do not incorporate the information on or accessible through our website into this prospectus, and you should not consider any information on, or that can be accessed through, our website as part of this prospectus.

Implications of Being an Emerging Growth Company

We qualify as an "emerging growth company" as defined in the Jumpstart Our Business Startups Act of 2012, as amended (JOBS Act). As an emerging growth company, we may take advantage of specified reduced disclosure and other requirements that are otherwise applicable generally to public companies. These provisions include:

- only two years of audited financial statements in addition to any required unaudited interim financial statements with correspondingly reduced "Management's Discussion and Analysis of Financial Condition and Results of Operations" disclosure;
- reduced disclosure about our executive compensation arrangements;
- no non-binding advisory votes on executive compensation or golden parachute arrangements; and
- exemption from the auditor attestation requirement in the assessment of our internal control over financial reporting.

We may take advantage of these exemptions for up to five years or such earlier time that we are no longer an emerging growth company. We would cease to be an emerging growth company on the date that is the earliest of (i) the last day of the fiscal year in which we have total annual gross revenues of $1.07 billion or more; (ii) the last day of our fiscal year following the fifth anniversary of the date of the closing of this offering; (iii) the date on which we have issued more than $1 billion in nonconvertible debt during the previous three years; or (iv) the date on which we are deemed to be a large accelerated filer under the rules of the Securities and Exchange Commission (SEC). We may choose to take advantage of some but not all of these exemptions. We have taken advantage of reduced reporting requirements in this prospectus. Accordingly, the information contained herein may be different from the information you receive from other public companies in which you hold stock.

We have irrevocably elected to "opt out" of the exemption for the delayed adoption of certain accounting standards and, therefore, will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

THE OFFERING	
Common stock offered by us	5,770,000 shares.
Concurrent private placement	Seattle Genetics, Inc. (Seattle Genetics) has agreed to purchase from us, concurrently with this offering in a private placement, $5.0 million of shares of our common stock at a price per share equal to the initial public offering price, or 416,666 shares. We will receive the full proceeds from the sale and will not pay any underwriting discounts or commissions with respect to the shares of common stock that are sold in the private placement. The sale of these shares of common stock to Seattle Genetics will not be registered under the Securities Act of 1933, as amended, and these shares will be subject to a 180-day lock-up agreement with the underwriters for this offering. We refer to the private placement of these shares as the concurrent private placement. The closing of this offering is not conditioned upon the closing of the concurrent private placement.
Common stock to be outstanding immediately after this offering and the concurrent private placement	29,617,718 shares (30,483,218 shares if the underwriters exercise their option to purchase additional shares in full).
Underwriters' option to purchase additional shares	We have granted a 30-day option to the underwriters to purchase up to an aggregate of 865,500 additional shares of common stock from us at the public offering price, less underwriting discounts and commissions, on the same terms as set forth in this prospectus. The underwriters may exercise this option solely for the purpose of covering over-allotments, if any, made in connection with the offering of the shares of common stock offered by this prospectus.
Use of proceeds	We estimate that we will receive net proceeds from the sale of shares of our common stock in this offering of approximately $61.6 million, or $71.3 million if the underwriters exercise their option to purchase additional shares in full, after deducting underwriting discounts and commissions and estimated offering expenses payable by us. Our proceeds from the concurrent private placement will be $5.0 million. We intend to use the net proceeds from this offering and the concurrent private placement, together with our existing cash, cash equivalents, and marketable securities, to advance ACTR087 used in combination with rituximab for adult patients with r/r B cell non-Hodgkin lymphoma through the completion of our ongoing Phase I clinical trial; to fund a Phase II clinical trial of ACTR087 used in combination with rituximab for adult patients with r/r non-Hodgkin lymphoma who received prior CD19 CAR-T therapy; to advance ACTR707 used in combination with rituximab for adult patients with r/r B cell non-Hodgkin lymphoma through the completion of our Phase I clinical trial; to advance ACTR707 used in

	combination with trastuzumab through submission of an IND and to fund our Phase I clinical trial for this product candidate; and the remainder to develop product candidates in earlier stages of development and any additional product candidates that we select, to expand headcount and internal capabilities, and for working capital and other general corporate purposes. For a more complete description of our intended use of the proceeds from this offering and the concurrent private placement, see "Use of Proceeds."
Risk factors	You should carefully read the "Risk Factors" section of this prospectus for a discussion of factors that you should consider before deciding to invest in our common stock.
Nasdaq Global Select Market symbol	"UMRX"

Certain of our existing stockholders, including affiliates of our directors, have agreed to purchase an aggregate of approximately $27.1 million of shares of our common stock in this offering at the initial public offering price.

The number of shares of our common stock to be outstanding after this offering and the concurrent private placement is based on 23,431,052 shares of our common stock outstanding as of January 31, 2018, after giving effect to the automatic conversion of all outstanding shares of our preferred stock as of January 31, 2018 into an aggregate of 13,229,362 shares of common stock upon the closing of this offering, and excludes:

- 3,150,889 shares of our common stock issuable upon the exercise of stock options outstanding as of January 31, 2018, at a weighted average exercise price of $4.01 per share;
- 982,525 shares of our common stock available for future issuance as of January 31, 2018 under our 2015 Stock Incentive Plan, as amended (2015 Plan), which were made available for issuance under our 2018 Stock Option and Incentive Plan (2018 Plan) upon effectiveness of the 2018 Plan;
- 2,547,558 shares of our common stock reserved for future issuance under our 2018 Plan, which became effective upon the date immediately preceding the date of the effectiveness of the registration statement of which this prospectus is a part (of which we have granted options to purchase an aggregate of 777,071 shares of our common stock, with an exercise price per share equal to the initial public offering price in this offering, to certain of our employees and non-employee directors in connection with this offering); and
- 314,000 shares of our common stock reserved for future issuance under our 2018 Employee Stock Purchase Plan, which became effective upon the effectiveness of the registration statement of which this prospectus is a part.

Unless otherwise indicated, all information in this prospectus reflects or assumes the following:

- the filing of our amended and restated certificate of incorporation and the effectiveness of our amended and restated bylaws upon the closing of this offering;
- the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 13,229,362 shares of common stock upon the closing of this offering;
- no exercise of outstanding options after January 31, 2018;

- the issuance and sale by us in the concurrent private placement of 416,666 shares of common stock to Seattle Genetics;
- a 1-for-1.5701314513884 reverse split of our common stock effected on March 16, 2018; and
- no exercise by the underwriters of their option to purchase up to 865,500 additional shares of common stock in this offering.

Summary Consolidated Financial Data

You should read the following summary consolidated financial data together with our consolidated financial statements and the related notes appearing elsewhere in this prospectus and the "Selected Consolidated Financial Data" and "Management's Discussion and Analysis of Financial Condition and Results of Operations" sections of this prospectus. We have derived the consolidated statement of operations data for the years ended December 31, 2015, 2016, and 2017 and the consolidated balance sheet data as of December 31, 2017 from our audited consolidated financial statements appearing elsewhere in this prospectus. Our historical results are not necessarily indicative of the results that may be expected in the future.

	Year Ended December 31,		
	2015	2016	2017
	(in thousands, except per share data)		
Consolidated Statement of Operations Data:			
Collaboration revenue	$ 2,986	$ 6,355	$ 8,360
Operating expenses:			
Research and development	6,852	21,992	29,832
General and administrative	2,726	3,433	4,680
Total operating expenses	9,578	25,425	34,512
Loss from operations	(6,592)	(19,070)	(26,152)
Other income (expense):			
Interest income	—	265	386
Other income, net	—	681	274
Total other income, net	—	946	660
Net loss	(6,592)	(18,124)	(25,492)
Accretion of redeemable convertible preferred stock to redemption value	(43)	(64)	(65)
Net loss attributable to common stockholders	$ (6,635)	$ (18,188)	$ (25,557)
Net loss per share attributable to common stockholders, basic and diluted(1)	$ (0.65)	$ (1.78)	$ (2.51)
Weighted average common shares outstanding, basic and diluted(1)	10,190	10,190	10,192
Pro forma net loss per share attributable to common stockholders, basic and diluted (unaudited)(2)			$ (1.09)
Pro forma weighted average common shares outstanding, basic and diluted (unaudited)(2)			23,421

(1) See Note 13 to our consolidated financial statements appearing elsewhere in this prospectus for details on the calculation of basic and diluted net loss per share attributable to common stockholders.

(2) See Note 13 to our consolidated financial statements appearing elsewhere in this prospectus for details on the calculation of basic and diluted pro forma net loss per share attributable to common stockholders.

	As of December 31, 2017		
	Actual	Pro Forma(2)	Pro Forma As Adjusted(3)
	(in thousands)		
Consolidated Balance Sheet Data:			
Cash, cash equivalents, and marketable securities	$ 40,961	$ 40,961	$ 108,343
Working capital(1)	31,189	31,189	99,155
Total assets	49,115	49,115	115,124
Redeemable convertible preferred stock	77,151	—	—
Total stockholders' equity (deficit)	(48,846)	28,305	94,898

(1) We define working capital as current assets less current liabilities.

(2) The pro forma balance sheet data give effect to the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 13,229,362 shares of common stock upon the closing of this offering.

(3) The pro forma as adjusted balance sheet data give further effect to (i) our issuance and sale of 5,770,000 shares of common stock in this offering at the initial public offering price of $12.00 per share, after deducting underwriting discounts and commissions and estimated offering expenses payable by us, and (ii) the issuance and sale by us in the concurrent private placement of 416,666 shares of common stock to Seattle Genetics, Inc.

RISK FACTORS

Investing in our common stock involves a high degree of risk. You should carefully consider the risks described below, as well as the other information in this prospectus, including our financial statements and the related notes and "Management's Discussion and Analysis of Financial Condition and Results of Operations," before deciding whether to invest in our common stock. The occurrence of any of the events or developments described below could harm our business, financial condition, results of operations and growth prospects. In such an event, the market price of our common stock could decline and you may lose all or part of your investment. Additional risks and uncertainties not presently known to us or that we currently deem immaterial also may impair our business operations.

Risks Related to Our Business and Industry

We have incurred net losses in every year since our inception and anticipate that we will continue to incur net losses in the future.

We are a clinical-stage biopharmaceutical company with a limited operating history. Investment in biopharmaceutical product development is highly speculative because it entails substantial upfront capital expenditures and significant risk that any potential product candidate will fail to demonstrate adequate effect or an acceptable safety profile, gain regulatory approval and become commercially viable. We have no products approved for commercial sale and have not generated any revenue from product sales to date, and we continue to incur significant research and development and other expenses related to our ongoing operations. As a result, we are not profitable and have incurred losses in each period since our inception in March 2014. For the years ended December 31, 2015, 2016, and 2017, we reported net losses of $6.6 million, $18.1 million, and $25.5 million, respectively. As of December 31, 2017, we had an accumulated deficit of $51.3 million. We expect to continue to incur significant losses for the foreseeable future, and we expect these losses to increase as we continue our research and development of, and seek regulatory approvals for, product candidates.

Even if we succeed in commercializing one or more of our product candidates, we will continue to incur substantial research and development and other expenditures to develop and market additional product candidates. We may encounter unforeseen expenses, difficulties, complications, delays and other unknown factors that may adversely affect our business. The size of our future net losses will depend, in part, on the rate of future growth of our expenses and our ability to generate revenue. Our prior losses and expected future losses have had and will continue to have an adverse effect on our stockholders' equity and working capital.

Our ACTR T cell product candidates represent a novel approach to cancer treatment, which creates significant challenges for us.

Our ACTR T cell product candidates involve (1) harvesting T cells from the patient's blood via leukapheresis, (2) genetically engineering the T cells to incorporate the ACTR transgene, (3) expanding the number of engineered T cells to the desired dose level and (4) infusing the engineered ACTR T cells back into the patient with or following the administration of the antibody. Advancing this novel and personalized investigational therapy creates significant challenges for us, including:

- educating medical personnel about the administration of the ACTR-combination therapy;
- educating medical personnel regarding the potential side effect profile of our product candidates, such as the potential adverse side effects related to cytokine release syndrome, neurotoxicity or autoimmune or rheumatologic disorders;
- administering chemotherapy to patients in advance of administering our product candidates, which may increase the risk of adverse side effects;
- sourcing clinical and, if approved, commercial, supplies for the materials used to manufacture and process our product candidates;

- manufacturing viral vectors to deliver ACTR to T cells;
- developing a robust and reliable ACTR T cell manufacturing process, including efficiently managing shipment of patient cells from and to clinical sites, minimizing potential contamination to the cell product and effectively scaling manufacturing capacity to meet demand;
- managing costs of inputs and other supplies while scaling production;
- using medicines to manage adverse side effects of our product candidates, which may not adequately control the side effects and/or may have a detrimental impact on the efficacy of the treatment;
- obtaining and maintaining regulatory approval from the U.S. Food and Drug Administration (FDA); and
- establishing sales and marketing capabilities upon obtaining any regulatory approval to gain market acceptance of a novel therapy.

In developing our product candidates we have not exhaustively explored different options in the design of the ACTR construct and in the method for manufacturing ACTR T cells. We may find our existing ACTR T cells and manufacturing process may be substantially improved with future design or process changes, necessitating development of new backup ACTR constructs and further clinical testing and delaying launch of our first products. For example:

- We have made a large number of ACTR constructs and used preclinical tests to select product candidates to advance into clinical testing. The preclinical tests are limited in their ability to predict behavior in patients. As we gain clinical experience with ACTR, new learnings may prompt us to select other ACTR constructs for clinical development.
- We have used a retroviral vector to deliver ACTR to T cells. In the future, we may find that a lentiviral vector offers advantages. Switching from retroviral to lentiviral delivery would necessitate additional process development and clinical testing and delay existing product candidates.
- The process by which patient cells are converted into an ACTR T cell has many steps that can influence quality and activity. We have explored a subset of variables and expect to continue to improve and optimize the manufacturing process. Depending upon the nature of the process changes, we may be compelled to perform bridging studies and/or to re-start clinical development, causing delays in time to market and potentially introducing a risk of failure if new processes do not perform as expected.

Our business is highly dependent on the success of ACTR087 used in combination with rituximab or ACTR707 used in combination with rituximab, our lead product candidates, and other ACTR-antibody combinations that we may develop.

Our business and future success depend on our ability to obtain regulatory approval of and then successfully commercialize one of our product candidates, such as ACTR087 used in combination with rituximab and other product combinations that we develop using antibodies in combination with ACTR087 or ACTR707. All of our product candidates, including ACTR087 used in combination with rituximab and ACTR 707 used in combination with rituximab, are in the early stages of development and will require additional clinical and non-clinical development, regulatory review and approval, substantial investment, access to sufficient commercial manufacturing capacity and significant marketing efforts before we can generate any revenue from product sales. In addition, because ACTR087 used in combination with rituximab and ACTR707 used in combination with rituximab are our two most advanced product candidates, and because all our other product candidates are based on our ACTR platform, if either of these product candidates encounters safety, efficacy, or manufacturing problems, developmental delays, regulatory, or commercialization difficulties or other problems, our development plans and business would be significantly harmed. For example, our Phase I clinical trial for ACTR087 used in combination with rituximab was placed on clinical hold in December 2017 pending submission of certain information relating to the trial. The clinical hold was removed in February 2018, following review of this information by the FDA.

Our clinical trials may fail to demonstrate adequately the safety and efficacy of any of our product candidates, which would prevent or delay regulatory approval and commercialization.

Before obtaining regulatory approvals for the commercial sale of our product candidates, including ACTR087 used in combination with rituximab and other product candidates that we develop using antibodies in combination with ACTR087 and ACTR707, we must demonstrate through lengthy, complex and expensive preclinical testing and clinical trials that our product candidates are both safe and effective for use in each target indication. Clinical testing is expensive and can take many years to complete, and its outcome is inherently uncertain. Failure can occur at any time during the clinical trial process, and, because our product candidates are in an early stage of development, there is a high risk of failure and we may never succeed in developing marketable products. The results of preclinical studies and early clinical trials of our product candidates may not be predictive of the results of later-stage clinical trials. There is typically an extremely high rate of attrition from the failure of product candidates proceeding through clinical trials. Product candidates in later stages of clinical trials may fail to show the desired safety and efficacy profile despite having progressed through preclinical studies and initial clinical trials. A number of companies in the biopharmaceutical industry have suffered significant setbacks in advanced clinical trials due to lack of efficacy, insufficient durability of efficacy, or unacceptable safety issues, notwithstanding promising results in earlier trials. Most product candidates that commence clinical trials are never approved as products.

Any clinical trials that we may conduct may not demonstrate the efficacy and safety necessary to obtain regulatory approval to market our product candidates. If the results of our ongoing or future clinical trials are inconclusive with respect to the efficacy of our product candidates, if we do not meet the clinical endpoints with statistical and clinically meaningful significance, or if there are safety concerns associated with our product candidates, we may be prevented or delayed in obtaining marketing approval for such product candidates. In some instances, there can be significant variability in safety or efficacy results between different clinical trials of the same product candidate due to numerous factors, including changes in trial procedures set forth in protocols, differences in the size and type of the patient populations, changes in and adherence to the clinical trial protocols and the rate of dropout among clinical trial participants.

We designed our Phase I clinical trial of ACTR087 used in combination with rituximab, called ATTCK-20-2, primarily to assess safety and efficacy in adult patients with r/r NHL. The preliminary results from the Phase I clinical trial of ACTR087 used in combination with rituximab may not be indicative of the final analysis of this Phase I clinical trial, especially given the small number of patients that we plan to dose in the trial. In addition, the Phase I results may not predict results for any further clinical testing of ACTR087 used in combination with rituximab or other product candidates that we have developed, or may develop in the future, using antibodies in combination with ACTR087 and ACTR707 or in different indications.

Additionally, as of the most recent data cutoff date of March 7, 2018, approximately 12% (two out of 17) of ACTR087 treated patients in ATTCK-20-2 experienced ACTR087-related severe cytokine release syndrome (CRS) and 6% (one out of 17) of patients experienced ACTR087-related neurotoxicity, which was fatal. Of the two events of CRS, one patient subsequently experienced a fatal case of enterococcal sepsis considered related to ACTR087 and one patient subsequently experienced a fatal case of sepsis considered not related to ACTR087. These events resulted in the FDA placing this trial on clinical hold in December 2017 pending submission of certain information relating to the ATTCK-20-2 clinical trial. The clinical hold was removed in February 2018, following review of this information by the FDA. Several protocol and dosing changes were made in early 2018, which we expect to reduce the incidence of severe adverse events and better manage those events that do occur. If severe safety events are observed in patients treated in the future in spite of the modifications outlined above, the FDA may determine, at any time, that there is an unacceptable safety risk for patients and we may be required to stop the trial prior to its completion or our ongoing clinical trials may be halted or put on further clinical holds prior to completion.

In addition, even if the trials are successfully completed, clinical data are often susceptible to varying interpretations and analyses, and we cannot guarantee that the FDA or foreign regulatory authorities will interpret the

results as we do, and more trials could be required before we submit our product candidates for approval. For instance, although our lead product candidates will be dosed in refractory patients with antibodies that the patients have already received, we plan to test future product candidates in patients that have never received the co-administered antibody in prior treatment and with antibodies that have never been independently evaluated for safety or efficacy. As a result, it may be difficult to demonstrate that the ACTR construct, rather than the antibody alone, is causing an observed effect. We cannot guarantee that the FDA will view the ACTR construct as having efficacy even if positive results are observed in these clinical trials. To the extent that the results of the trials are not satisfactory to the FDA or foreign regulatory authorities for support of a marketing application, approval of our product candidates may be significantly delayed, or we may be required to expend significant additional resources, which may not be available to us, to conduct additional trials in support of potential approval of our product candidates.

We cannot guarantee that our product candidates will show any functionality in the solid tumor environment.

While we plan to develop product candidates for use in solid tumor cancers, including ACTR707 used in combination with trastuzumab for HER2+ cancers, we cannot guarantee that our product candidates will show any functionality in the solid tumor environment. The cellular environment in which solid tumor cancers exist is inimical to T cells due to several factors including: (1) immunosuppressive cells (e.g., regulatory T cells (Tregs), myeloid derived suppressor cells (MDSCs)), (2) immunosuppressive enzymes and signaling molecules (e.g., IDO1, TGF-beta), (3) limited nutrients (e.g., oxygen, glucose), and (4) toxic metabolites (e.g., reactive oxygen species, lactic acid). Together, these factors can limit the ability of T cells, including ACTR T cells, both to penetrate into the solid tumor and to function properly once there. As a result of these and other solid tumor challenges, our product candidates may not demonstrate efficacy in solid tumors. For example, our ACTR-based product candidates may not be able to access the solid tumor, and even if they do, they may not be able to exert anti-tumor effects in an immunosuppressive tumor microenvironment. In addition, the safety profile of our product candidates may differ in a solid tumor setting. If we are unable to make our product candidates function in solid tumor cancers, our development plans and business may be significantly harmed.

Since the number of patients that we have dosed, or plan to dose, in our ongoing or planned Phase I clinical trials is small, the results from such clinical trials, once completed, may be less reliable than results achieved in larger clinical trials, which may hinder our efforts to obtain regulatory approval for our product candidates.

A study design that is considered appropriate for regulatory approval includes a sufficiently large sample size with appropriate statistical power, as well as proper control of bias, to allow a meaningful interpretation of the results. In our ongoing Phase I clinical trial of ACTR087 used in combination with rituximab, for example, we have analyzed the dose-limiting toxicities of ACTR087 used in combination with rituximab in only 17 patients with r/r NHL so far, 12 of whom were evaluable for anti-tumor effects. The preliminary results of trials with smaller sample sizes, such as our ongoing Phase I clinical trial for ACTR087 used in combination with rituximab, can be disproportionately influenced by the impact the treatment had on a few individuals, which limits the ability to generalize the results across a broader community, thus making the study results less reliable than studies with a larger number of patients. As a result, there may be less certainty that such product candidates would achieve a statistically significant effect in any future clinical trials. If we conduct any future clinical trials, we may not achieve a statistically significant result or the same level of statistical significance, if any, that we may see in our Phase I clinical trial, once we complete the trial.

We may not be able to file investigational new drug applications (INDs) or IND amendments to commence additional clinical trials on the timelines we expect, and even if we are able to, the FDA may not permit us to proceed.

We expect to submit an IND for ACTR707 used in combination with trastuzumab in 2018. However, our timing of filing on the product candidate is dependent on further research. We cannot be sure that submission of

an IND will result in the FDA allowing further clinical trials to begin, or that, once begun, issues will not arise that suspend or terminate such clinical trials. Additionally, even if such regulatory authorities agree with the design and implementation of the clinical trials set forth in an IND or clinical trial application, we cannot guarantee that such regulatory authorities will not change their requirements in the future. These considerations also apply to new clinical trials we may submit as amendments to existing INDs.

We have limited experience as a company conducting clinical trials or managing a manufacturing facility for our product candidates.

We have limited experience as a company in conducting clinical trials. In part because of this lack of experience, we cannot be certain that our ongoing clinical trials will be completed on time or if the planned clinical trials will begin or be completed on time, if at all. Large-scale trials would require significant additional financial and management resources and reliance on third-party clinical investigators, contract research organizations (CROs), or consultants. Relying on third-party clinical investigators or CROs may force us to encounter delays that are outside of our control.

In the future, we also intend to operate our own manufacturing facility, which will require significant resources, and we have limited experience as a company in expanding or managing a manufacturing facility. In part because of this lack of experience, we cannot be certain that our manufacturing facility will be completed on time, if at all, or if the planned clinical trials will begin or be completed on time, if at all. In part because of our inexperience, we may have unacceptable or inconsistent product quality success rates and yields, and we may be unable to maintain adequate quality control, quality assurance and qualified personnel. In addition, if we switch from one manufacturing facility to our own manufacturing facility for one or more of our product candidates in the future, we may need to conduct additional preclinical studies to bridge our modified product candidates to earlier versions. Failure to successfully create and operate our proposed manufacturing facility could adversely affect the commercial viability of our product candidates.

Our product candidates may cause undesirable side effects or have other properties that could halt their clinical development, prevent their regulatory approval, require expansion of the trial size, limit their commercial potential, or result in significant negative consequences.

Undesirable side effects caused by our product candidates could cause us or regulatory authorities, including institutional review boards (IRBs), to interrupt, delay, or halt clinical trials and could result in a more restrictive label or the delay or denial of regulatory approval by the FDA or other comparable foreign regulatory authorities. Further, clinical trials by their nature utilize a sample of the potential patient population. With a limited number of subjects and limited duration of exposure, rare and severe side effects of our product candidates may only be uncovered with a significantly larger number of patients exposed to the drug. Because of our dose escalation design for our clinical trials, undesirable side effects could also result in an expansion in the size of our clinical trials, increasing the expected costs and timeline of our clinical trials. Additionally, results of our trials could reveal a high and unacceptable severity and prevalence of side effects or unexpected characteristics.

In certain trials of CAR-based products, which also use an engineered T cell, side effects, such as CRS and neurotoxicity, arose that resulted in risk, injury, or death to the patients. We observed some of these side effects in the second dose level of our Phase I clinical trial of ACTR087 used in combination with rituximab, called ATTCK-20-2. These events resulted in the FDA placing the trial on clinical hold pending submission of certain information relating to the ATTCK-20-2 clinical trial. The clinical hold was removed in February 2018, following review of this information by the FDA. We will likely continue to observe some or all of these side effects in our clinical trials at additional dosage levels. We have established safety management and monitoring guidelines for clinical investigators to detect and treat potential side effects. However, there is no guarantee that these medical interventions will be effective in preventing negative effects to the patient. Additionally, if we do continue to observe severe side effects in our clinical trials, our ongoing clinical trials may be halted or put on an additional clinical hold prior to completion if there is an unacceptable safety risk for patients.

Autoimmune reaction triggered by an interaction between a patient's naturally occurring antibodies and ACTR T cells is a theoretical safety risk unique to the ACTR approach. If a patient's self-generated antibodies were directed to a target expressed on the surface of cells in normal tissue (i.e., autoantibodies), ACTR would be directed to attack these tissues, potentially resulting in off-tumor effects. These autoantibodies may be present whether or not the patient has an active autoimmune disease. In our clinical testing, we have taken steps to minimize the likelihood of this happening (e.g., excluding patients with a history of autoimmune disease from our trials and screening for the presence of certain autoantibodies). To date, we have not observed any autoimmune adverse effects in clinical testing of ACTR. There is no guarantee, however, that we will not observe autoimmune reactions in the future and no guarantee that if we do, that we will be able to implement interventions to address the risk.

If unacceptable toxicities arise in the development of our product candidates, we could suspend or terminate our trials or the FDA or comparable foreign regulatory authorities, or local regulatory authorities such as IRBs, could order us to cease clinical trials. Competent national health authorities, such as the FDA, could also deny approval of our product candidates for any or all targeted indications. Treatment-related side effects could also affect patient recruitment or the ability of enrolled patients to complete the trial or result in potential product liability claims. In addition, these side effects may not be appropriately recognized or managed by the treating medical staff, as toxicities resulting from T cell therapy are not normally encountered in the general patient population and by medical personnel. We expect to have to train medical personnel using ACTR to understand the side effect profile of ACTR for both our planned clinical trials and upon any commercialization of any product candidates, if approved. Inadequate training in recognizing or managing the potential side effects of ACTR could result in patient deaths. Any of these occurrences may harm our business, financial condition and prospects significantly.

If we encounter difficulties enrolling patients in our clinical trials, our clinical development activities could be delayed or otherwise adversely affected.

We may experience difficulties in patient enrollment in our clinical trials for a variety of reasons. The timely completion of clinical trials in accordance with their protocols depends, among other things, on our ability to enroll a sufficient number of patients who remain in the study until its conclusion. The enrollment of patients depends on many factors, including:

- the patient eligibility criteria defined in the protocol;
- the size of the patient population required for analysis of the trial's primary endpoints;
- the proximity of patients to trial sites;
- the design of the trial;
- our ability to recruit clinical trial investigators with the appropriate competencies and experience;
- our ability to obtain and maintain patient consents;
- reporting of the preliminary results of any of our clinical trials; and
- the risk that patients enrolled in clinical trials will drop out of the trials before the manufacturing and infusion of our product candidates or trial completion.

In addition, our clinical trials will compete with other clinical trials for product candidates that are in the same therapeutic areas as our product candidates, and this competition will reduce the number and types of patients available to us because some patients who might have opted to enroll in our trials may instead opt to enroll in a trial being conducted by one of our competitors. Since the number of qualified clinical investigators is limited, we expect to conduct some of our clinical trials at the same clinical trial sites that some of our competitors use, which will reduce the number of patients who are available for our clinical trials at such clinical trial sites. Moreover, because our product candidates represent a departure from more commonly used methods for cancer treatment, potential patients and their doctors may be inclined to use conventional therapies, such as

chemotherapy and hematopoietic stem cell transplantation, rather than enroll patients in any future clinical trial. Additionally, because some of our clinical trials are in patients with relapsed/refractory cancer, the patients are typically in the late stages of the disease and may experience disease progression independent from our product candidates, making them unevaluable for purposes of the trial and requiring additional enrollment.

Delays in patient enrollment may result in increased costs or may affect the timing or outcome of our ongoing and planned clinical trials, which could prevent completion or commencement of these trials and adversely affect our ability to advance the development of our product candidates.

Clinical trials are expensive, time-consuming, and difficult to design and implement.

Human clinical trials are expensive and difficult to design and implement, in part because they are subject to rigorous regulatory requirements. Because our product candidates are based on new technology and engineered on a patient-by-patient basis, we expect that they will require extensive research and development and have substantial manufacturing and processing costs. In addition, costs to treat patients with relapsed or refractory cancer and to treat potential side effects that may result from our product candidates can be significant. Accordingly, our clinical trial costs are likely to be significantly higher than those for more conventional therapeutic technologies or drug product candidates. In addition, our proposed personalized product candidates involve several complex and costly manufacturing and processing steps, the costs of which will be borne by us.

The market opportunities for our product candidates may be limited to those patients who are ineligible for or have failed prior treatments, and may be small, and our estimates of the prevalence of our target patient populations may be inaccurate.

Cancer therapies are sometimes characterized as first line, second line, or third line, and the FDA often approves new therapies initially only for a particular line of use. When cancer is detected early enough, first line therapy is sometimes adequate to cure the cancer or prolong life without a cure. Whenever first line therapy, usually chemotherapy, antibody drugs, tumor-targeted small molecules, hormone therapy, radiation therapy, surgery, or a combination of these, proves unsuccessful, second line therapy may be administered. Second line therapies often consist of more chemotherapy, radiation, antibody drugs, tumor-targeted small molecules, or a combination of these. Third line therapies can include hematopoietic stem cell transplantation in certain cancers, chemotherapy, antibody drugs, and small molecule tumor-targeted therapies, more invasive forms of surgery, and new revolutionary technologies. We expect to initially seek approval of our product candidates in most instances at least as a third line therapy, for use in patients with relapsed or refractory metastatic cancer. Subsequently, for those products that prove to be sufficiently safe and beneficial, if any, we would expect to seek approval as a second line therapy and potentially as a first line therapy, but there is no guarantee that our product candidates, even if approved as a third or subsequent line of therapy, would be approved for an earlier line of therapy, and, prior to any such approvals, we may have to conduct additional clinical trials.

Our projections of both the number of people who have the cancers we are targeting, as well as the subset of people with these cancers in a position to receive a particular line of therapy and who have the potential to benefit from treatment with our product candidates, are based on our beliefs and estimates. These estimates have been derived from a variety of sources, including scientific literature, surveys of clinics, patient foundations or market research, and may prove to be incorrect. Further, new therapies may change the estimated incidence or prevalence of these cancers. The number of patients may turn out to be lower than expected. Additionally, the potentially addressable patient population for our product candidates may be limited or may not be amenable to treatment with our product candidates. For instance, we expect ACTR087 used in combination with rituximab to initially target a small patient population that suffers from r/r NHL. Even if we obtain significant market share for our product candidates within our addressable patient population, because the potential target populations are small, we may never achieve profitability without obtaining regulatory approval for additional indications, including use as first or second line therapy.

If we fail to develop additional product candidates, our commercial opportunity will be limited.

We have developed a pipeline of product candidates and intend to pursue clinical development of additional product candidates that combine ACTR T cells with different antibodies and target different tumor types. Developing, obtaining regulatory approval for and commercializing additional product candidates will require substantial additional funding beyond the net proceeds of this offering and is prone to the risks of failure inherent in medical product development. We cannot provide you any assurance that we will be able to successfully advance any of these additional product candidates through the development process.

Even if we receive FDA approval to market additional product candidates for the treatment of cancer, we cannot assure you that any such product candidates will be successfully commercialized, widely accepted in the marketplace or more effective than other commercially available alternatives. If we are unable to successfully develop and commercialize additional product candidates, our commercial opportunity will be limited. Moreover, a failure in obtaining regulatory approval of additional product candidates may have a negative effect on the approval process of any other, or result in losing approval of any approved product candidate.

ACTR therapies rely on the use of antibodies to target specific cancers, which are developed by third parties. We are limited in our ability to apply ACTR to a wider range of potential target cancers by our ability to partner for or acquire these antibodies on commercially reasonable terms.

ACTR therapies require the use of tumor-specific antibodies, which guide the ACTR and bind to the antigens on the surface of a tumor, to target specific types of cancers. Many of our current and proposed clinical trials rely on the use of commercially available and well-understood antibodies, such as rituximab and trastuzumab. Our ability to develop and commercialize our ACTR T cells used in combination with rituximab, trastuzumab, or any other FDA-approved antibody will depend on our ability to purchase such antibodies on commercially reasonable terms for the clinical trials and their availability for the commercialized product, if approved.

We also plan to expand the use of our ACTR platform in combination with one or more other antibodies that have not yet been approved for marketing by the FDA or similar regulatory authorities outside of the United States, as planned with our product candidate ACTR087 used in combination with SEA-BCMA in adult patients with r/r multiple myeloma. Our ability to develop product candidates using unapproved antibodies will rely on our ability to acquire such antibodies through partnerships or collaborations on commercially reasonable terms. However, we cannot be certain that potential future collaborations will provide us with a steady supply of antibodies that we can utilize in combination with ACTR to develop future product candidates. If we are unable to enter into such strategic collaborations on commercially reasonable terms or fail to realize the benefits of any such collaboration, we may be limited to using approved antibodies in combination with ACTR087, ACTR707, or any other future ACTR construct we may develop.

We have entered into a collaboration agreement with Seattle Genetics, Inc. (Seattle Genetics), pursuant to which Seattle Genetics will generate antibodies against two target antigens to use in combination with ACTR T cells to develop future product candidates. Under the agreement, Seattle Genetics had the option to elect a third target antigen, but its option expired unexercised in June 2017. We cannot be certain that the collaboration agreement with Seattle Genetics will provide us with antibodies that we can successfully combine with ACTR T cells.

The failure to enter into a successful collaboration or the expense of purchasing an approved antibody may delay our development timelines, increase our costs and jeopardize our ability to develop ACTR087, ACTR707, or any other future ACTR construct we may develop as a commercially viable drug, which could result in delays in product development and harm our business.

ACTR therapies rely on the use of antibodies to target specific cancers, which the FDA may revoke approval for or may not approve, independent of the safety or efficacy of our ACTR T cells.

We have developed, are developing, and intend to develop product candidates using ACTR087 or ACTR707 used in combination with one or more currently approved antibodies, such as rituximab for r/r NHL and

trastuzumab for HER2+ cancers. If the FDA or similar regulatory authorities outside of the United States revoke approval of any antibodies we use in combination with ACTR087, ACTR707 or any other future cell product candidates based on our ACTR platform, we will not be able to market any products made in combination with such revoked antibodies.

If safety or efficacy issues arise with any of these antibodies, we could experience significant regulatory delays, and the FDA or similar regulatory authorities outside of the United States may require us to redesign or terminate the applicable clinical trials. In addition, the approval of ACTR in combination with an antibody may require clinical trials to demonstrate the safety and efficacy of the therapeutic antibody on its own. If the antibodies we use in combination with ACTR087, ACTR707, or any other future ACTR construct we may develop are replaced as the standard of care for the indications we choose to target, the FDA or similar regulatory authorities outside of the United States may require us to conduct additional clinical trials. In addition, if manufacturing or other issues result in a shortage of supply of the antibodies with which we determine to combine with ACTR087, ACTR707, or any other future ACTR construct we may develop, we may not be able to complete clinical development of ACTR087, ACTR707, or any other future ACTR construct we may develop on our current timeline or at all.

Even if ACTR087, ACTR707, or any other future ACTR construct we may develop were to receive marketing approval or be commercialized for use in combination with other existing antibodies, we would continue to be subject to the risks that the FDA or similar regulatory authorities outside of the United States could revoke approval of an antibody used in combination with ACTR087, ACTR707, or any other future ACTR construct we may develop, or that safety, efficacy, manufacturing or supply issues could arise with these existing antibodies. Combination therapies are commonly used for the treatment of cancer, and we would be subject to similar risks, such as revocation of regulatory approval for one part of the combination therapy, if we develop any of our other product candidates for use in combination with other antibodies. This could result in our own products being removed from the market or being less successful commercially.

We also plan to consider ACTR087, ACTR707 or any other future product candidates based on our ACTR platform in combination with one or more other antibodies that have not yet been approved for marketing by the FDA or similar regulatory authorities outside of the United States, as planned with our product candidate ACTR087 used in combination with SEA-BCMA in adult patients with r/r multiple myeloma. We will not be able to market and sell ACTR087, ACTR707 or any other future product candidates based on our ACTR platform in combination with any such unapproved antibodies that do not ultimately obtain marketing approval, either as a standalone or used in combination with our ACTR T cells. If the FDA or similar regulatory authorities outside of the United States determines that we need to demonstrate the separate safety or efficacy of the applicable antibodies, or if safety, efficacy, manufacturing, or supply issues arise with the antibodies we choose to evaluate in combination with ACTR087, ACTR707 or any other future ACTR construct we may develop, we may be unable to obtain approval of or market ACTR087, ACTR707 or any other future ACTR construct we may develop.

If the FDA or similar regulatory authorities outside of the United States revoke their approval or do not approve these other antibodies, or if safety, efficacy, manufacturing, or supply issues arise with the antibodies we choose to evaluate in combination with ACTR087, ACTR707 or any other future ACTR construct we may develop, we may be unable to obtain approval of or market ACTR087, ACTR707 or any other future ACTR construct we may develop.

We currently have no marketing and sales organization and have no experience in marketing products. If we are unable to establish marketing and sales capabilities or enter into agreements with third parties to market and sell our product candidates, if approved, we may not be able to generate product revenue.

We currently have no sales, marketing or distribution capabilities and have no experience in marketing products. We intend to develop an in-house marketing organization and sales force, which will require significant

capital expenditures, management resources and time. We will have to compete with other pharmaceutical and biotechnology companies to recruit, hire, train and retain marketing and sales personnel.

If we are unable or decide not to establish internal sales, marketing and distribution capabilities, we will pursue collaborative arrangements regarding the sales and marketing of our products, if approved. For instance, if any co-developed products under our collaboration with Seattle Genetics are approved, we plan to co-commercialize them with Seattle Genetics in the United States, and Seattle Genetics will commercialize them outside of the United States. However, there can be no assurance that we will be able to establish or maintain such collaborative arrangements, or if we are able to do so, that they will have effective sales forces. Any revenue we receive will depend upon the efforts of such third parties, which may not be successful. We may have little or no control over the marketing and sales efforts of such third parties and our revenue from product sales may be lower than if we had commercialized our product candidates ourselves. We also face competition in our search for third parties to assist us with the sales and marketing efforts of our product candidates.

There can be no assurance that we will be able to develop in-house sales and distribution capabilities or establish or maintain relationships with third-party collaborators to commercialize any product in the United States or overseas.

A variety of risks associated with marketing our product candidates internationally could materially adversely affect our business.

We plan to seek regulatory approval of our product candidates outside of the United States and, accordingly, we expect that we will be subject to additional risks related to operating in foreign countries if we obtain the necessary approvals, including:

- differing regulatory requirements in foreign countries;
- unexpected changes in tariffs, trade barriers, price and exchange controls and other regulatory requirements;
- economic weakness, including inflation, or political instability in particular foreign economies and markets;
- compliance with tax, employment, immigration and labor laws for employees living or traveling abroad;
- foreign taxes, including withholding of payroll taxes;
- foreign currency fluctuations, which could result in increased operating expenses and reduced revenue, and other obligations incident to doing business in another country;
- difficulties staffing and managing foreign operations;
- workforce uncertainty in countries where labor unrest is more common than in the United States;
- potential liability under the Foreign Corrupt Practices Act of 1977 or comparable foreign regulations;
- challenges enforcing our contractual and intellectual property rights, especially in those foreign countries that do not respect and protect intellectual property rights to the same extent as the United States;
- production shortages resulting from any events affecting raw material supply or manufacturing capabilities abroad; and
- business interruptions resulting from geo-political actions, including war and terrorism.

These and other risks associated with our international operations may materially adversely affect our ability to attain or maintain profitable operations.

We face significant competition from other biotechnology and pharmaceutical companies, and our operating results will suffer if we fail to compete effectively.

The biopharmaceutical industry is characterized by intense competition and rapid innovation. Our competitors may be able to develop other products or drugs that are able to achieve similar or better results. Our potential competitors include major multinational pharmaceutical companies, established biotechnology companies, specialty pharmaceutical companies and universities and other research institutions. Many of our competitors have substantially greater financial, technical and other resources, such as larger research and development staff and experienced marketing and manufacturing organizations and well-established sales forces. In addition, many of these competitors are active in seeking patent protection and licensing arrangements in anticipation of collecting royalties for use of technology that they have developed. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large, established companies. Mergers and acquisitions in the biotechnology and pharmaceutical industries may result in even more resources being concentrated in our competitors. Competition may increase further as a result of advances in the commercial applicability of technologies and greater availability of capital for investment in these industries. Our competitors, either alone or with collaborative partners, may succeed in developing, acquiring or licensing on an exclusive basis drug or biologic products that are more effective, safer, more easily commercialized or less costly than our product candidates or may develop proprietary technologies or secure patent protection that we may need for the development of our technologies and products. We believe the key competitive factors that will affect the development and commercial success of our product candidates are efficacy, safety, tolerability, reliability, convenience of use, price and reimbursement.

Specifically, by genetically engineering T cell products, we face significant competition in both the CAR technology and TCR space from multiple companies, including Kite Pharma, Inc. (a Gilead Sciences, Inc. company), Juno Therapeutics, Inc. (which was recently acquired by Celgene Corporation), Novartis AG, and bluebird bio, Inc. Even if we obtain regulatory approval of our product candidates, the availability and price of our competitors' products could limit the demand and the price we are able to charge for our product candidates. We may not be able to implement our business plan if the acceptance of our product candidates is inhibited by price competition or the reluctance of physicians to switch from existing methods of treatment to our product candidates, or if physicians switch to other new drug or biologic products or choose to reserve our product candidates for use in limited circumstances. For additional information regarding our competition, see "Business—Competition."

We are highly dependent on our key personnel, and if we are not successful in attracting and retaining highly qualified personnel, we may not be able to successfully implement our business strategy.

Our ability to compete in the highly competitive biotechnology and pharmaceutical industries depends upon our ability to attract and retain highly qualified managerial, scientific and medical personnel. We are highly dependent on our management, scientific and medical personnel, including our Chief Executive Officer, our President and Chief Financial Officer, our Chief Scientific Officer, our Chief Medical Officer, and our Chief Technical Officer. The loss of the services of any of our executive officers, other key employees and other scientific and medical advisors, and an inability to find suitable replacements could result in delays in product development and harm our business.

We conduct our operations at our facility in Cambridge, Massachusetts. This region is headquarters to many other biopharmaceutical companies and many academic and research institutions. Competition for skilled personnel in our market is intense and may limit our ability to hire and retain highly qualified personnel on acceptable terms or at all.

To induce valuable employees to remain at our company, in addition to salary and cash incentives, we have provided stock options that vest over time. The value to employees of stock options that vest over time may be significantly affected by movements in our stock price that are beyond our control, and may at any time be insufficient to counteract more lucrative offers from other companies. Despite our efforts to retain valuable

employees, members of our management, scientific and development teams may terminate their employment with us on short notice. Although we have employment agreements with our key employees, these employment agreements provide for at-will employment, which means that any of our employees could leave our employment at any time, with or without notice. We maintain a "key man" insurance policy on the life of our Chief Executive Officer, but do not maintain "key man" insurance on the lives of our other management personnel or the lives of any of our other employees. Our success also depends on our ability to continue to attract, retain and motivate highly skilled junior, mid-level and senior managers as well as junior, mid-level and senior scientific and medical personnel.

We will need to grow the size of our organization, and we may experience difficulties in managing this growth.

As of January 31, 2018, we had 53 employees. As our development and commercialization plans and strategies develop, and as we transition into operating as a public company, we expect to need additional managerial, operational, sales, marketing, financial and other personnel, as well as additional facilities to expand our operations. Future growth would impose significant added responsibilities on members of management, including:

- identifying, recruiting, integrating, maintaining and motivating additional employees;
- managing our internal development efforts effectively, including the clinical and FDA review process for our product candidates, while complying with our contractual obligations to contractors and other third parties; and
- improving our operational, financial and management controls, reporting systems and procedures.

Our future financial performance and our ability to commercialize our product candidates will depend, in part, on our ability to effectively manage any future growth, and our management may also have to divert a disproportionate amount of its attention away from day-to-day activities in order to devote a substantial amount of time to managing these growth activities.

We currently rely, and for the foreseeable future will continue to rely, in substantial part on certain independent organizations, advisors and consultants to provide certain services, including substantially all aspects of regulatory approval, clinical trial management and manufacturing. There can be no assurance that the services of independent organizations, advisors and consultants will continue to be available to us on a timely basis when needed, or that we can find qualified replacements. In addition, if we are unable to effectively manage our outsourced activities or if the quality or accuracy of the services provided by consultants is compromised for any reason, our clinical trials may be extended, delayed or terminated, and we may not be able to obtain regulatory approval of our product candidates or otherwise advance our business. There can be no assurance that we will be able to manage our existing consultants or find other competent outside contractors and consultants on economically reasonable terms, or at all.

If we are not able to effectively expand our organization by hiring new employees and expanding our groups of consultants and contractors, or we are not able to effectively build out new facilities to accommodate this expansion, we may not be able to successfully implement the tasks necessary to further develop and commercialize our product candidates and, accordingly, may not achieve our research, development and commercialization goals.

We have entered into a strategic collaboration with Seattle Genetics and may form or seek collaborations or strategic alliances or enter into additional licensing arrangements in the future, and we may not realize the benefits of such alliances or licensing arrangements.

We may form or seek strategic alliances, create joint ventures or collaborations, or enter into additional licensing arrangements with third parties that we believe will complement or augment our development and commercialization efforts with respect to our product candidates and any future product candidates that we may develop. In particular, we may seek to enter into collaborations to give us access to antibodies to use in

combination with our ACTR platform. Any of these relationships may require us to incur non-recurring and other charges, increase our near and long-term expenditures, issue securities that dilute our existing stockholders or disrupt our management and business. For example, we entered into a collaboration agreement with Seattle Genetics pursuant to which Seattle Genetics has agreed to generate antibodies against two target antigens and we are responsible for creating ACTR T cells to pair with these antibodies to create combination product candidates. However, there are ways in which Seattle Genetics may elect to opt-out from further development and commercialization of the resulting product candidates. If Seattle Genetics elects to exercise one of these options our timelines could be delayed and our business otherwise adversely affected, and we cannot be certain that we will achieve the revenue or specific net income that justifies this transaction.

In addition, we face significant competition in seeking appropriate strategic partners and the negotiation process is time-consuming and complex. Moreover, we may not be successful in our efforts to establish a strategic partnership or other alternative arrangements for our product candidates because they may be deemed to be at too early of a stage of development for collaborative effort and third parties may not view our product candidates as having the requisite potential to demonstrate safety and efficacy and obtain marketing approval.

Further, collaborations involving our product candidates are subject to numerous risks, which may include the following:

- collaborators have significant discretion in determining the efforts and resources that they will apply to a collaboration;
- collaborators may not pursue development and commercialization of our product candidates or may elect not to continue or renew development or commercialization of our product candidates based on clinical trial results, changes in their strategic focus due to the acquisition of competitive products, availability of funding or other external factors, such as a business combination that diverts resources or creates competing priorities;
- collaborators may delay clinical trials, provide insufficient funding for a clinical trial, stop a clinical trial, abandon a product candidate, repeat or conduct new clinical trials or require a new formulation of a product candidate for clinical testing;
- collaborators could independently develop, or develop with third parties, products that compete directly or indirectly with our product candidates;
- a collaborator with marketing and distribution rights to one or more products may not commit sufficient resources to their marketing and distribution;
- collaborators may not properly maintain or defend our intellectual property rights or may use our intellectual property or proprietary information in a way that gives rise to actual or threatened litigation that could jeopardize or invalidate our intellectual property or proprietary information or expose us to potential liability;
- disputes may arise between us and a collaborator that cause the delay or termination of the research, development or commercialization of our product candidates, or that result in costly litigation or arbitration that diverts management attention and resources;
- collaborations may be terminated and, if terminated, may result in a need for additional capital to pursue further development or commercialization of the applicable product candidates; and
- collaborators may own or co-own intellectual property covering our products that results from our collaborating with them, and in such cases, we would not have the exclusive right to commercialize such intellectual property.

As a result, if we enter into additional collaboration agreements and strategic partnerships or license our product candidates, we may not be able to realize the benefit of such transactions if we are unable to successfully integrate them with our existing operations and company culture, which could delay our timelines or otherwise

adversely affect our business. We also cannot be certain that, following a strategic transaction or license, we will achieve the revenue or specific net income that justifies such transaction. Any delays in entering into new collaborations or strategic partnership agreements related to our product candidates could delay the development and commercialization of our product candidates in certain geographies for certain indications, which would harm our business prospects, financial condition, and results of operations.

If we fail to obtain additional financing, we may be unable to complete the development and commercialization of our product candidates.

Our operations have consumed substantial amounts of cash since inception. We expect to continue to spend substantial amounts to continue the clinical development of our product candidates, including our current and planned clinical trials for ACTR087 used in combination with rituximab and ACTR707 used in combination with rituximab. If approved, we will require significant additional amounts in order to launch and commercialize our product candidates.

We estimate that our net proceeds from this offering will be approximately $61.6 million, after deducting underwriting discounts and commissions and estimated offering expenses payable by us. Our proceeds from the concurrent private placement will be $5.0 million. We intend to use the net proceeds from this offering and the concurrent private placement, together with our existing cash, cash equivalents, and marketable securities, to advance ACTR087 used in combination with rituximab for adult patients with r/r B cell non-Hodgkin lymphoma through the completion of our ongoing Phase I clinical trial; to fund a Phase II clinical trial of ACTR087 used in combination with rituximab for adult patients with r/r non-Hodgkin lymphoma who received prior CD19 CAR-T therapy; to advance ACTR707 used in combination with rituximab for adult patients with r/r B cell non-Hodgkin lymphoma through the completion of our Phase I clinical trial; to advance ACTR707 used in combination with trastuzumab through submission of an IND and to fund our Phase I clinical trial for this product candidate; and to develop product candidates in earlier stages of development and any additional product candidates that we select, to expand headcount and internal capabilities, and for working capital and other general corporate purposes. We believe that such proceeds, together with our existing cash, cash equivalents, and marketable securities, will be sufficient to fund our operations through at least December 2019. However, we know that our existing cash, cash equivalents, and marketable securities, and our available borrowings under our loan and security agreement, even with the proceeds of this offering and the concurrent private placement, will not be sufficient to complete our planned Phase II clinical trial of ACTR087 used in combination with rituximab for adult patients with r/r non-Hodgkin lymphoma who received prior CD19 CAR-T therapy or our planned Phase I clinical trial of ACTR707 used in combination with trastuzumab for patients with HER2+ cancers, and we will need to raise additional funds to complete these trials. Additionally, changing circumstances may cause us to consume capital significantly faster than we currently anticipate, and we may need to spend more money than currently expected because of circumstances beyond our control. We may require additional capital for the further development and commercialization of our product candidates and may need to raise additional funds sooner if we choose to expand more rapidly than we presently anticipate.

We cannot be certain that additional funding will be available on acceptable terms, or at all. If we are unable to raise additional capital in sufficient amounts or on terms acceptable to us, we may have to significantly delay, scale back or discontinue the development or commercialization of our product candidates or other research and development initiatives. Our license agreements may also be terminated if we are unable to meet the payment obligations under the agreements. We could be required to seek collaborators for our product candidates at an earlier stage than otherwise would be desirable or on terms that are less favorable than might otherwise be available or relinquish or license on unfavorable terms our rights to our product candidates in markets where we otherwise would seek to pursue development or commercialization ourselves.

Any of the above events could significantly harm our business, prospects, financial condition and results of operations and cause the price of our common stock to decline.

Raising additional capital may cause dilution to our existing stockholders, restrict our operations or require us to relinquish rights to our technologies or product candidates.

We may seek additional capital through a combination of public and private equity offerings, debt financings, strategic partnerships and alliances and licensing 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 may include liquidation or other preferences that adversely affect your rights as a stockholder. The incurrence of indebtedness would result in increased fixed payment obligations and could involve certain restrictive covenants, such as limitations on our ability to incur additional debt, limitations on our ability to acquire or license intellectual property rights and other operating restrictions that could adversely impact our ability to conduct our business. If we raise additional funds through strategic partnerships and alliances and licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies or product candidates, or grant licenses on terms unfavorable to us.

Our internal computer systems, or those used by our third-party CROs or other contractors or consultants, may fail or suffer security breaches, which could result in a material disruption of the development programs of our product candidates.

Despite the implementation of security measures, our internal computer systems and those of our current and future CROs and other contractors and consultants are vulnerable to damage from computer viruses, unauthorized access, natural disasters, and telecommunication and electrical failures. While we have not experienced any such material system failure or security breach to date, if such an event were to occur and cause interruptions in our operations, it could result in a material disruption of our development programs and our business operations. For example, the loss of clinical trial data from completed or future clinical trials could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. Likewise, we rely on third parties for the manufacture of our product candidates and to conduct clinical trials, and similar events relating to their computer systems could also have a material adverse effect on our business. To the extent that any disruption or security breach were to result in a loss of, or damage to, our data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur liability and the further development and commercialization of our product candidates could be delayed.

Business disruptions could seriously harm our future revenue and financial condition and increase our costs and expenses.

Our operations, and those of our CROs, commercial manufacturing organizations (CMOs), and other contractors and consultants, could be subject to earthquakes, power shortages, telecommunications failures, water shortages, floods, hurricanes, typhoons, fires, extreme weather conditions, medical epidemics and other natural or man-made disasters or business interruptions, for which we are predominantly self-insured. The occurrence of any of these business disruptions could seriously harm our operations and financial condition and increase our costs and expenses. We rely on third-party manufacturers to produce and process our product candidates on a patient-by-patient basis. Our ability to obtain clinical supplies of our product candidates could be disrupted if the operations of these suppliers are affected by a man-made or natural disaster or other business interruption.

Our employees, independent contractors, consultants, commercial partners and vendors may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements.

We are exposed to the risk of employee fraud or other illegal activity by our employees, independent contractors, consultants, commercial partners and vendors. Misconduct by these parties could include intentional, reckless and/or negligent conduct that fails to: comply with the regulations of the FDA and other similar foreign regulatory bodies, provide true, complete and accurate information to the FDA and other similar foreign regulatory bodies, comply with manufacturing standards we have established, comply with healthcare fraud and abuse laws in the United States and similar foreign fraudulent misconduct laws or report financial information or

data accurately or to disclose unauthorized activities to us. If we obtain FDA approval of any of our product candidates and begin commercializing those products in the United States, our potential exposure under such laws and regulations will increase significantly, and our costs associated with compliance with such laws and regulations are also likely to increase. These laws may impact, among other things, our current activities with principal investigators and research patients, as well as proposed and future sales, marketing and education programs. In particular, the promotion, sales and marketing of healthcare items and services, as well as certain business arrangements in the healthcare industry, are subject to extensive laws designed to prevent fraud, kickbacks, self-dealing and other abusive practices. These laws and regulations may restrict or prohibit a wide range of pricing, discounting, marketing and promotion, structuring and commission(s), certain customer incentive programs and other business arrangements generally. Activities subject to these laws also involve the improper use of information obtained in the course of patient recruitment for clinical trials. The laws that may affect our ability to operate include, but are not limited to:

- the federal Anti-Kickback Statute, which prohibits, among other things, knowingly and willfully soliciting, receiving, offering or paying any remuneration (including any kickback, bribe, or rebate), directly or indirectly, overtly or covertly, in cash or in kind, to induce, or in return for, either the referral of an individual, or the purchase, lease, order or recommendation of any good, facility, item or service for which payment may be made, in whole or in part, under a federal healthcare program, such as the Medicare and Medicaid programs;
- federal civil and criminal false claims laws and civil monetary penalty laws, which prohibit, among other things, individuals or entities from knowingly presenting, or causing to be presented, claims for payment or approval from Medicare, Medicaid, or other third-party payors that are false or fraudulent or knowingly making a false statement to improperly avoid, decrease or conceal an obligation to pay money to the federal government;
- the federal Health Insurance Portability and Accountability Act of 1996 (HIPAA), which created new federal criminal statutes that prohibit knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program or obtain, by means of false or fraudulent pretenses, representations, or promises, any of the money or property owned by, or under the custody or control of, any healthcare benefit program, regardless of the payor (e.g., public or private) and knowingly and willfully falsifying, concealing or covering up by any trick or device a material fact or making any materially false statements in connection with the delivery of, or payment for, healthcare benefits, items or services relating to healthcare matters;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009 (HITECH), and their respective implementing regulations, which impose requirements on certain covered healthcare providers, health plans, and healthcare clearinghouses as well as their respective business associates that perform services for them that involve the use, or disclosure of, individually identifiable health information, relating to the privacy, security and transmission of individually identifiable health information without appropriate authorization;
- the federal Physician Payment Sunshine Act, created under the Patient Protection and Affordable Care Act as amended by the Health Care and Education Reconciliation Act of 2010, collectively, the Affordable Care Act, and its implementing regulations, which require manufacturers of drugs, devices, biologicals 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 the United States Department of Health and Human Services (HHS) information related to payments or other transfers of value made to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors) and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members; and
- federal consumer protection and unfair competition laws, which broadly regulate marketplace activities and activities that potentially harm consumers.

Additionally, we are subject to state and foreign equivalents of each of the healthcare laws described above, among others, some of which may be broader in scope and may apply regardless of the payor.

Effective upon the closing of this offering, we will adopt a code of business conduct and ethics, but it is not always possible to identify and deter employee misconduct, and the precautions we take to detect and prevent inappropriate conduct may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to be in compliance with such laws or regulations.

Efforts to ensure that our business arrangements will comply with applicable healthcare laws may involve substantial costs. It is possible that governmental and enforcement authorities will conclude that our business practices may not comply with current or future statutes, regulations or case law interpreting applicable fraud and abuse or other healthcare laws and regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, including the imposition of civil, criminal and administrative penalties, damages, disgorgement, monetary fines, possible exclusion from participation in Medicare, Medicaid and other federal healthcare programs, contractual damages, reputational harm, diminished profits and future earnings and curtailment of our operations, any of which could adversely affect our ability to operate our business and our results of operations. In addition, the approval and commercialization of any of our product candidates outside the United States will also likely subject us to foreign equivalents of the healthcare laws mentioned above, among other foreign laws.

If product liability lawsuits are brought against us, we may incur substantial liabilities and may be required to limit commercialization of our product candidates.

We face an inherent risk of product liability as a result of the clinical testing of our product candidates and will face an even greater risk if we commercialize any products. For example, we may be sued if our product candidates cause or are perceived to cause injury or are found to be otherwise unsuitable during clinical testing, manufacturing, marketing or sale. Any such product liability claims may include allegations of defects in manufacturing, defects in design, a failure to warn of dangers inherent in the product, negligence, strict liability or a breach of warranties. Claims could also be asserted under state consumer protection acts. If we cannot successfully defend ourselves against product liability claims, we may incur substantial liabilities or be required to limit commercialization of our product candidates. Even successful defense would require significant financial and management resources. Regardless of the merits or eventual outcome, liability claims may result in:

- decreased demand for our product candidates or products that we may develop;
- injury to our reputation;
- withdrawal of clinical trial participants;
- initiation of investigations by regulators;
- costs to defend the related litigation;
- a diversion of management’s time and our resources;
- substantial monetary awards to trial participants or patients;
- product recalls, withdrawals or labeling, marketing or promotional restrictions;
- loss of revenue;
- exhaustion of any available insurance and our capital resources;
- the inability to commercialize any product candidate; and
- a decline in our share price.

Failure to obtain or retain sufficient product liability insurance at an acceptable cost to protect against potential product liability claims could prevent or inhibit the commercialization of products we develop, alone or

with corporate collaborators. Although we have clinical trial insurance, our insurance policies also have various exclusions, and we may be subject to a product liability claim for which we have no coverage. We may have to pay any amounts awarded by a court or negotiated in a settlement that exceed our coverage limitations or that are not covered by our insurance, and we may not have, or be able to obtain, sufficient capital to pay such amounts. Even if our agreements with any future corporate collaborators entitle us to indemnification against losses, such indemnification may not be available or adequate should any claim arise.

Comprehensive tax reform legislation could adversely affect our business and financial condition.

On December 22, 2017, President Trump signed into law the Tax Cuts and Jobs Act (TCJA) that significantly reforms the Internal Revenue Code of 1986, as amended. The TCJA, 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; limitation of the deduction for net operating losses and elimination of net operating loss carrybacks, in each case, for losses arising in taxable years beginning after December 31, 2017 (though any such tax losses may be carried forward indefinitely); 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 generally referred to as “orphan drugs”. The tax rate change resulted in (i) a reduction in the gross amount of our deferred tax assets recorded as of December 31, 2017, without an impact on the net amount of our deferred tax assets, which are recorded with a full valuation allowance, and (ii) no income tax expense or benefit being recognized as of the enactment date of the TCJA. We continue to examine the impact this tax reform legislation may have on our business. However, the effect of the TCJA on us and our affiliates, whether adverse or favorable, is uncertain and may not become evident for some period of time. You are urged to consult your tax adviser regarding the implications of the TCJA on an investment in our common stock.

Our ability to utilize our net operating loss carryforwards and certain other tax attributes may be limited.

Under Sections 382 and 383 of the Internal Revenue Code of 1986, as amended, if a corporation undergoes an “ownership change” (generally defined as a greater than 50% change (by value) in its equity ownership over a three-year period), the corporation’s ability to use its pre-change net operating loss carryforwards and other pre-change tax attributes to offset its post-change taxable income may be limited. As a result of our most recent private placements and other transactions that have occurred over the past three years, we may have experienced, and, upon closing of this offering, may experience, an “ownership change.” We may also experience ownership changes in the future as a result of subsequent shifts in our stock ownership. As of December 31, 2017, we had U.S. federal net operating loss carryforwards of $29.8 million and U.S. federal research and development tax credit carryforwards of $2.7 million, which could be limited if we experience an “ownership change.” The reduction of the corporate tax rate under the TCJA may cause a reduction in the economic benefit of our net operating loss carryforwards and other deferred tax assets available to the us. Under the TCJA, net operating losses generated after December 31, 2017 will not be subject to expiration.

The terms of our loan and security agreement may restrict our ability to engage in certain transactions and subject our assets to collateralization.

In January 2017, we entered into a loan and security agreement with Pacific Western Bank (PWB). Pursuant to the terms of the loan and security agreement, subject to certain exceptions, we cannot engage in certain transactions without PWB’s prior written consent, which shall not be unreasonably withheld. Such transactions include:

- disposing of our business or certain assets;
- changing our business, management, ownership or business locations;
- incurring additional debt or liens or making payments on other debt;
- making certain investments and declaring dividends;

- acquiring or merging with another entity;
- engaging in transactions with affiliates; or
- encumbering intellectual property.

If PWB does not provide its consent to such actions, we could be prohibited from engaging in transactions that could be beneficial to our business and our stockholders unless we were to repay the loans, which may not be desirable or possible. The loan and security agreement is collateralized by a pledge of substantially all of our assets, except for our intellectual property. If we were to default under the loan and security agreement, including for an inability to repay amounts as they become due, and we were unable to obtain a waiver for such a default, PWB would have a right to accelerate our obligation to repay the entire loan and foreclose on these assets in order to satisfy our obligations under the loan and security agreement. In addition, PWB would also have the right to place a hold on our accounts maintained at PWB and refuse to fund any then unfunded commitments under the loan and security agreement. Any such action on the part of PWB against us could have a materially adverse impact on our business, financial condition and results of operations.

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

As widely reported, 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. There can be no assurance that further deterioration in credit and financial markets and confidence in economic conditions will not occur. Our general business strategy may be adversely affected by any such economic downturn, volatile business environment or continued 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 and other partners may not survive these difficult economic times, which could directly affect our ability to attain our operating goals on schedule and on budget.

As of December 31, 2017, we had cash, cash equivalents, and marketable securities of $41.0 million and available borrowings under our loan and security agreement of $15.0 million. While we are not aware of any downgrades, material losses, or other significant deterioration in the fair value of our cash equivalents and marketable securities since December 31, 2017, no assurance can be given that further deterioration of the global credit and financial markets would not 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 the general economic downturn.

Risks Related to Our Reliance On Third Parties

We rely and will rely on third parties to conduct our clinical trials. If these third parties do not properly and successfully carry out their contractual duties or meet expected deadlines, we may not be able to obtain regulatory approval of or commercialize our product candidates.

We depend and will depend upon independent investigators and collaborators, such as medical institutions, CROs, CMOs and strategic partners to conduct our preclinical studies and clinical trials under agreements with us. We expect to have to negotiate budgets and contracts with CROs, trial sites and CMOs which may result in delays to our development timelines and increased costs. We will rely heavily on these third parties over the course of our clinical trials, and we control only certain aspects of their activities. As a result, we have less direct control over the conduct, timing and completion of these clinical trials and the management of data developed

through clinical trials than would be the case if we were relying entirely upon our own staff. Nevertheless, we are responsible for ensuring that each of our studies is conducted in accordance with applicable protocol, legal and regulatory requirements and scientific standards, and our reliance on third parties does not relieve us of our regulatory responsibilities. We and these third parties are required to comply with good clinical practices (GCPs), which are regulations and guidelines enforced by the FDA and comparable foreign regulatory authorities for product candidates in clinical development. Regulatory authorities enforce these GCPs through periodic inspections of trial sponsors, principal investigators and trial sites. If we or any of these third parties fail to comply with applicable GCP regulations, the clinical data generated in our clinical trials may be deemed unreliable and the FDA or comparable foreign regulatory authorities may require us to perform additional clinical trials before approving our marketing applications. We cannot assure you that, upon inspection, such regulatory authorities will determine that any of our clinical trials comply with the GCP regulations. In addition, our clinical trials must be conducted with biologic product produced under current good manufacturing practices (cGMP) regulations and will require a large number of test patients. Our failure or any failure by these third parties to comply with these regulations or to recruit a sufficient number of patients may require us to repeat clinical trials, which would delay the regulatory approval process. Moreover, our business may be implicated if any of these third parties violates federal or state fraud and abuse or false claims laws and regulations or healthcare privacy and security laws.

Any third parties conducting our clinical trials are not and will not be our employees and, except for remedies available to us under our agreements with such third parties, we cannot control whether or not they devote sufficient time and resources to our ongoing, clinical and non-clinical product candidates. These third parties may also have relationships with other commercial entities, including our competitors, for whom they may also be conducting clinical trials or other drug development activities, which could affect their performance on our behalf. If these third parties do not successfully carry out their contractual duties or obligations or meet expected deadlines, if they need to be replaced 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 other reasons, our clinical trials may be extended, delayed or terminated and we may not be able to complete development of, obtain regulatory approval of or successfully commercialize our product candidates. As a result, our financial results and the commercial prospects for our product candidates would be harmed, our costs could increase and our ability to generate revenue could be delayed.

Switching or adding third parties to conduct our clinical trials involves substantial cost and requires extensive management time and focus. In addition, there is a natural transition period when a new third party commences work. As a result, delays occur, which can materially impact our ability to meet our desired clinical development timelines.

We expect to rely on third parties to manufacture our clinical product supplies, and we may rely on third parties for at least a portion of the manufacturing process of our product candidates, if approved. Our business could be harmed if those third parties fail to provide us with sufficient quantities of clinical product supplies or product candidates or fail to do so at acceptable quality levels or prices.

We do not currently own any facility that may be used as our clinical-scale manufacturing and processing facility and must currently rely on outside vendors to manufacture supplies and process our product candidates, which is and will need to be done on a patient-by-patient basis. We have not yet caused our product candidates to be manufactured or processed on a commercial scale and may not be able to do so for any of our product candidates.

Although in the future we do intend to develop our own manufacturing facility, we also intend to use third parties as part of our manufacturing process and may, in any event, never be successful in developing our own manufacturing facility. Our anticipated reliance on a limited number of third-party manufacturers exposes us to the following risks:

- We may be unable to identify manufacturers on acceptable terms or at all because the number of potential manufacturers is limited and the FDA must inspect any manufacturers for current cGMP

compliance as part of our marketing application. In addition, a new manufacturer would have to be educated in, or develop substantially equivalent processes for, the production of our product candidates.

- Our manufacturers may have little or no experience with autologous cell products, which are products made from a patient's own cells, and therefore may require a significant amount of support from us in order to implement and maintain the infrastructure and processes required to manufacture our product candidates.
- Our third-party manufacturers might be unable to timely manufacture our product candidates or produce the quantity and quality required to meet our clinical and commercial needs, if any.
- Our third-party suppliers or collaborators from whom we receive our antibodies used in combination with our ACTR T cells may be unable to timely manufacture or provide the applicable antibody or produce the quantity and quality required to meet our clinical and commercial needs.
- Contract manufacturers may not be able to execute our manufacturing procedures and other logistical support requirements appropriately.
- Our future contract manufacturers may not perform as agreed, may not devote sufficient resources to our product candidates or may not remain in the contract manufacturing business for the time required to supply our clinical trials or to successfully produce, store, and distribute our products, if any.
- Manufacturers are subject to ongoing periodic unannounced inspection by the FDA and corresponding state agencies to ensure strict compliance with cGMP and other government regulations and corresponding foreign standards. We do not have control over third-party manufacturers' compliance with these regulations and standards.
- We may not own, or may have to share, the intellectual property rights to any improvements made by our third-party manufacturers in the manufacturing process for our product candidates.
- Our third-party manufacturers could breach or terminate their agreements with us.
- Raw materials and components used in the manufacturing process, particularly those for which we have no other source or supplier, may not be available or may not be suitable or acceptable for use due to material or component defects.
- Our contract manufacturers and critical reagent suppliers may be subject to inclement weather, as well as natural or man-made disasters.
- Our contract manufacturers may have unacceptable or inconsistent product quality success rates and yields, and we have no direct control over our contract manufacturers' ability to maintain adequate quality control, quality assurance and qualified personnel.

Each of these risks could delay or prevent the completion of our clinical trials or the approval of any of our product candidates by the FDA, result in higher costs or adversely impact commercialization of our product candidates. In addition, we will rely on third parties to perform certain specification tests on our product candidates prior to delivery to patients. If these tests are not appropriately done and test data are not reliable, patients could be put at risk of serious harm and the FDA could place significant restrictions on our company until deficiencies are remedied.

The manufacture of biological drug products is complex and requires significant expertise and capital investment, including the development of advanced manufacturing techniques and process controls.

Manufacturers of biologic products often encounter difficulties in production, particularly in scaling up or out, validating the production process and assuring high reliability of the manufacturing process (including the absence of contamination). These problems include logistics and shipping, difficulties with production costs and yields, quality control, including stability of the product, product testing, operator error and availability of

qualified personnel, as well as compliance with strictly enforced federal, state and foreign regulations. Furthermore, if contaminants are discovered in our supply of our product candidates or in the manufacturing facilities, such manufacturing facilities may need to be closed for an extended period of time to investigate and remedy the contamination. We cannot assure you that any stability failures or other issues relating to the manufacture of our product candidates will not occur in the future.

We may fail to manage the logistics of collecting and shipping patient material to the manufacturing site and shipping the product candidate back to the patient. Logistical and shipment delays and problems caused by us, our vendors or other factors not in our control, such as weather, could prevent or delay the delivery of product candidates to patients. Additionally, we have to maintain a complex chain of identity and chain of custody with respect to patient material as it moves to the manufacturing facility, through the manufacturing process and back to the patient. Failure to maintain chain of identity and chain of custody could result in patient death, loss of product or regulatory action.

In addition, because our product candidates are all based upon the ACTR construct, any problems we encounter with manufacturing the ACTR construct would likely affect all of our products, if approved, and product candidates, increasing the impact of any manufacturing issues we encounter and potentially adversely affecting our ability to attain or maintain profitable operations.

ACTR therapies rely on the availability of specialty raw materials, which may not be available to us on acceptable terms or at all.

ACTR requires many specialty raw materials, some of which are manufactured by small companies with limited resources and experience to support a commercial product. In addition, those suppliers normally support blood-based hospital businesses and generally do not have the capacity to support commercial products manufactured under cGMP by biopharmaceutical firms. The suppliers may be ill-equipped to support our needs, especially in non-routine circumstances like an FDA inspection or medical crisis, such as widespread contamination. We also do not have contracts with many of these suppliers, and may not be able to contract with them on acceptable terms or at all. Accordingly, we may experience delays in receiving key raw materials to support clinical or commercial manufacturing.

In addition, some of our raw materials are currently available from a single supplier, or a small number of suppliers. The type of cell culture media and cryopreservation buffer that we currently use in our manufacturing process for ACTR087 and ACTR707 are each only available from a single supplier. In addition, the cell processing equipment and tubing that we use in our current manufacturing process is only available from a single supplier. We also use certain biologic materials, including certain activating antibodies, that are available from multiple suppliers, but each version may perform differently, requiring us to characterize them and potentially modify some of our protocols if we change suppliers. We cannot be sure that these suppliers will remain in business, or that they will not be purchased by one of our competitors or another company that is not interested in continuing to produce these materials for our intended purpose. Accordingly, if we no longer have access to these suppliers, we may experience delays in our clinical or commercial manufacturing which could harm our business or results of operations.

If our third-party manufacturers use hazardous and biological materials in a manner that causes injury or violates applicable law, we may be liable for damages.

Our research and development activities involve the controlled use of potentially hazardous substances, including chemical and biological materials, by our third-party manufacturers. Our manufacturers are subject to federal, state and local laws and regulations in the United States governing the use, manufacture, storage, handling and disposal of medical and hazardous materials. Although we believe that our manufacturers' procedures for using, handling, storing and disposing of these materials comply with legally prescribed standards, we cannot completely eliminate the risk of contamination or injury resulting from medical or hazardous materials. As a result of any such contamination or injury, we may incur liability or local, city, state or

federal authorities may curtail the use of these materials and interrupt our business operations. In the event of an accident, we could be held liable for damages or penalized with fines, and the liability could exceed our resources. We do not have any insurance for liabilities arising from medical or hazardous materials. Compliance with applicable environmental laws and regulations is expensive, and current or future environmental regulations may impair our research, development and production efforts, which could harm our business, prospects, financial condition or results of operations.

Risks Related to Government Regulation

The FDA regulatory approval process is lengthy and time-consuming, and we may experience significant delays in the clinical development and regulatory approval of our product candidates.

We have not previously submitted a Biologics License Application (BLA) to the FDA or similar approval applications to comparable foreign authorities. A BLA must include extensive preclinical and clinical data and supporting information to establish the product candidate's safety, purity and potency for each desired indication. The BLA must also include significant information regarding the manufacturing controls for the product. We expect the novel nature of our product candidates to create further challenges in obtaining regulatory approval. For example, the FDA has no experience with commercial development of ACTR therapies for cancer. Accordingly, the regulatory approval pathway for our product candidates may be uncertain, complex, expensive and lengthy, and approval may not be obtained.

We may also experience delays in completing planned clinical trials for a variety of reasons, including delays related to:

- the availability of financial resources to commence and complete the planned trials;
- reaching agreement on acceptable terms with prospective 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 approval at each clinical trial site by an IRB or ethics committee;
- recruiting suitable patients to participate in a trial;
- having patients complete a trial or return for post-treatment follow-up;
- clinical trial sites deviating from trial protocol or dropping out of a trial;
- adding new clinical trial sites; or
- manufacturing sufficient quantities of qualified materials under cGMPs and applying them on a subject by subject basis for use in clinical trials.

For example, we are advancing towards testing in an expanded patient cohort using an optimized dose of ACTR087 in Phase I of our ongoing ATTCK-20-2 trial. Patient enrollment in this expansion cohort is subject to obtaining IRB approval at each clinical trial site, and no assurances can be made that IRB approval will be obtained.

We could also experience delays if physicians encounter unresolved ethical issues associated with enrolling patients in clinical trials of our product candidates in lieu of prescribing existing treatments that have established safety and efficacy profiles. Further, a clinical trial may be suspended or terminated by us, the IRBs for the institutions in which such trials are being conducted, the Data Monitoring Committee for such trial, or by the FDA or other regulatory authorities due to a number of factors, including failure to conduct the clinical trial in accordance with regulatory requirements or our clinical protocols, inspection of the clinical trial operations or trial site by the FDA or other regulatory authorities resulting in the imposition of a clinical hold, unforeseen safety issues or adverse side effects, failure to demonstrate a benefit from using a product candidate, changes in governmental regulations or administrative actions or lack of adequate funding to continue the clinical trial. If we experience termination of, or

delays in the completion of, any clinical trial of our product candidates, the commercial prospects for our product candidates will be harmed, and our ability to generate product revenue will be delayed. In addition, any delays in completing our clinical trials will increase our costs, slow down our product development and approval process and jeopardize our ability to commence product sales and generate revenue.

Securing regulatory approval also requires the submission of information about the biologic manufacturing process and inspection of manufacturing facilities by the relevant regulatory authority. FDA or comparable foreign regulatory authorities may fail to approve our manufacturing processes or facilities, whether run by us or our CMOs. In addition, if we make manufacturing changes to our product candidates in the future, we may need to conduct additional preclinical studies to bridge our modified product candidates to earlier versions.

Many of the factors that cause, or lead to, a delay in the commencement or completion of clinical trials may ultimately lead to the denial of regulatory approval of our product candidates.

The FDA may disagree with our regulatory plan and we may fail to obtain regulatory approval of our product candidates.

We plan to continue to advance our lead product candidates, ACTR087 used in combination with rituximab and ACTR707 used in combination with rituximab, for the treatment of adult patients with r/r NHL through Phase I clinical trials. If we believe the Phase I data from either trial is compelling, we plan to discuss with the FDA the potential to move to a registration trial in r/r NHL upon completion of the current Phase I clinical trial. Additionally, we plan to submit regulatory filings to enable a Phase II clinical trial in 2018 to evaluate ACTR087 used in combination with rituximab in adult patients with r/r NHL who received prior CD19 CAR-T therapy. However, the general approach for FDA approval of a new biologic or drug is dispositive data from two well-controlled, Phase III clinical trials of the relevant biologic or drug in the relevant patient population. Phase III clinical trials typically involve hundreds of patients, have significant costs and take years to complete. The FDA may not believe our accelerated approval strategy to move directly to a registration trial for ACTR087 used in combination with rituximab in r/r NHL upon completion of the current Phase I clinical trial is warranted and may require a Phase III clinical trial or trials prior to approval.

Our clinical trial results may also not support approval. In addition, 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 number, design, or implementation of our clinical trials;
- we may be unable to demonstrate to the satisfaction of the FDA or comparable foreign regulatory authorities that our product candidates are safe, pure and potent, or effective, for any of their proposed indications;
- 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 may be unable to demonstrate that our product candidates' clinical and other benefits outweigh their safety risks;
- the FDA or comparable foreign regulatory authorities may disagree with our interpretation of data from preclinical studies or clinical trials;
- the data collected from clinical trials of our product candidates may not be sufficient to the satisfaction of the FDA or comparable foreign regulatory authorities to support the submission of a BLA or other comparable submission in foreign jurisdictions or to obtain regulatory approval in the United States or elsewhere;
- the FDA or comparable foreign regulatory authorities may find deficiencies with or fail to approve the manufacturing processes or facilities of third-party manufacturers with which we contract for clinical and commercial supplies; and

- the approval policies or regulations of the FDA or comparable foreign regulatory authorities may significantly change in a manner rendering our clinical data insufficient for approval.

Any of these factors, many of which are beyond our control, may result in our failing to obtain regulatory approval to market any of our product candidates, which would significantly harm our business, results of operations, and prospects.

Obtaining and maintaining regulatory approval of our product candidates in one jurisdiction does not mean that we will be successful in obtaining regulatory approval of our product candidates in other jurisdictions.

Obtaining and maintaining regulatory approval of our product candidates in one jurisdiction does not guarantee that we will be able to obtain or maintain regulatory approval in any other jurisdiction, while a failure or delay in obtaining regulatory approval in one jurisdiction may have a negative effect on the regulatory approval process in others. For example, even if the FDA grants marketing approval of a product candidate, comparable regulatory authorities in foreign jurisdictions must also approve the manufacturing, marketing and promotion of the product candidate in those countries. Approval procedures vary among jurisdictions and can involve requirements and administrative review periods different from, and greater than, those in the United States, including additional preclinical studies or clinical trials as clinical trials conducted in one jurisdiction may not be accepted by regulatory authorities in other jurisdictions. In many jurisdictions outside the United States, a product candidate must be approved for reimbursement before it can be approved for sale in that jurisdiction. In some cases, the price that we intend to charge for our products is also subject to approval.

We may also submit marketing applications in other countries. Regulatory authorities in jurisdictions outside of the United States have requirements for approval of product candidates with which we must comply prior to marketing in those jurisdictions. Obtaining foreign regulatory approvals and compliance with foreign regulatory requirements could result in significant delays, difficulties and costs for us and could delay or prevent the introduction of our products in certain countries. If we fail to comply with the regulatory requirements in international markets and/or receive applicable marketing approvals, our target market will be reduced and our ability to realize the full market potential of our product candidates will be harmed.

Even if we receive regulatory approval of our product candidates, we will be subject to ongoing regulatory obligations and continued regulatory review, which may result in significant additional expense and we may be subject to penalties if we fail to comply with regulatory requirements or experience unanticipated problems with our product candidates.

Any regulatory approvals that we receive for our product candidates will require surveillance to monitor the safety and efficacy of the product candidate. The FDA may also require a risk evaluation and mitigation strategy in order to approve our product candidates, which could entail requirements for a medication guide, physician communication plans or additional elements to ensure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. In addition, if the FDA or a comparable foreign regulatory authority approves our product candidates, the manufacturing processes, labeling, packaging, distribution, adverse event reporting, storage, advertising, promotion, import, export and recordkeeping for our product candidates will be subject to extensive and ongoing regulatory requirements. These requirements include submissions of safety and other post-marketing information and reports, registration, as well as continued compliance with cGMPs and GCPs for any clinical trials that we conduct post-approval. Later discovery of previously unknown problems with our product candidates, including adverse events of unanticipated severity or frequency, or with our third-party manufacturers or manufacturing processes, or failure to comply with regulatory requirements, may result in, among other things:

- restrictions on the marketing or manufacturing of our product candidates, withdrawal of the product from the market or voluntary or mandatory product recalls;

- fines, warning letters or holds on clinical trials;
- refusal by the FDA to approve pending applications or supplements to approved applications filed by us or suspension or revocation of license approvals;
- product seizure or detention, or refusal to permit the import or export of our product candidates; and
- injunctions or the imposition of civil or criminal penalties.

The FDA's and other regulatory authorities' policies may change and additional government regulations may be enacted that could prevent, limit or delay regulatory approval of our product candidates. 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 are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may lose any marketing approval that we may have obtained and we may not achieve or sustain profitability.

In addition, if we were able to obtain accelerated approval of ACTR087 or ACTR707 used in combination with an antibody, the FDA would require us to conduct a confirmatory study to verify the predicted clinical benefit and additional safety studies. The results from the confirmatory study may not support the clinical benefit, which would result in the approval being withdrawn.

Even if we obtain regulatory approval of our product candidates, the products may not gain market acceptance among physicians, patients, hospitals, cancer treatment centers and others in the medical community.

The use of engineered T cells as a potential cancer treatment is a recent development and may not become broadly accepted by physicians, patients, hospitals, cancer treatment centers and others in the medical community. Various factors will influence whether our product candidates are accepted in the market, including:

- the clinical indications for which our product candidates are approved;
- physicians, hospitals, cancer treatment centers and patients considering our product candidates as a safe and effective treatment;
- the potential and perceived advantages of our product candidates over alternative treatments;
- our ability to demonstrate the advantages of our product candidates over other CAR-T therapies;
- the prevalence and severity of any side effects;
- the prevalence and severity of any side effects for other adoptive cell therapy and CAR-T products and public perception of other adoptive cell therapy and CAR-T products;
- product labeling or product insert requirements of the FDA or other regulatory authorities;
- limitations or warnings contained in the labeling approved by the FDA;
- the timing of market introduction of our product candidates as well as competitive products;
- the cost of treatment in relation to alternative treatments;
- the availability of adequate coverage, reimbursement and pricing by third-party payors and government authorities;
- the willingness of patients to pay out-of-pocket in the absence of coverage by third-party payors and government authorities;
- relative convenience and ease of administration, including as compared to alternative treatments and competitive therapies; and
- the effectiveness of our sales and marketing efforts.

In addition, although we are not utilizing embryonic stem cells or replication competent vectors, adverse publicity due to the ethical and social controversies surrounding the therapeutic use of such technologies, and reported side effects from any clinical trials using these technologies or the failure of such trials to demonstrate that these therapies are safe and effective may limit market acceptance of our product candidates. If our product candidates are approved but fail to achieve market acceptance among physicians, patients, hospitals, cancer treatment centers or others in the medical community, we will not be able to generate significant revenue.

In addition, although our ACTR platform differs in certain ways from the CAR-T approach, serious adverse events or deaths in other clinical trials involving CAR-T or other T cell products or with use of approved CAR-T products, even if not ultimately attributable to the relevant product or product candidates, could result in increased government regulation, unfavorable public perception and publicity, potential regulatory delays in the testing or approval of our product candidates, stricter labeling requirements for those product candidates that are approved, and a decrease in demand for any such product candidates.

Even if our products achieve market acceptance, we may not be able to maintain that market acceptance over time if new products or technologies are introduced that are more favorably received than our products, are more cost effective or render our products obsolete.

Coverage and reimbursement may be limited or unavailable in certain market segments for our product candidates, which could make it difficult for us to sell our product candidates, if approved, profitably.

In both domestic and foreign markets, successful sales of our product candidates, if approved, will depend on the availability of adequate coverage and reimbursement from third-party payors. In addition, because our product candidates represent new approaches to the treatment of cancer, we cannot accurately estimate the potential revenue from our product candidates.

Patients who are provided medical treatment for their conditions generally rely on third-party payors to reimburse all or part of the costs associated with their treatment. Adequate coverage and reimbursement from governmental healthcare programs, such as Medicare and Medicaid, and commercial payors is critical to new product acceptance.

Government authorities and third-party payors, such as private health insurers and health maintenance organizations, decide which drugs and treatments they will cover and the amount of reimbursement. Reimbursement by a third-party payor may depend upon a number of factors, including, but not limited to, the third-party payor’s determination that use of a product is:

- a covered benefit under its health plan;
- safe, effective and medically necessary;
- appropriate for the specific patient;
- cost-effective; and
- neither experimental nor investigational.

Obtaining coverage and reimbursement approval of a product from a government or other third-party payor is a time-consuming and costly process that could require us to provide to the payor supporting scientific, clinical and cost-effectiveness data for the use of our products. Even if we obtain coverage for a given product, the resulting reimbursement payment rates might not be adequate for us to achieve or sustain profitability or may require co-payments that patients find unacceptably high. Patients are unlikely to use our product candidates unless coverage is provided and reimbursement is adequate to cover a significant portion of the cost of our product candidates.

In the United States, no uniform policy of coverage and reimbursement for products exists among third-party payors. 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 to provide scientific and clinical support for the use of our product candidates to each payor separately, with no assurance that coverage and adequate reimbursement will be obtained.

We intend to seek approval to market our product candidates in both the United States and in selected foreign jurisdictions. If we obtain approval in one or more foreign jurisdictions for our product candidates, we will be subject to rules and regulations in those jurisdictions. In some foreign countries, particularly those in the European Union, the pricing of biologics is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take considerable time after obtaining marketing approval of a product candidate. In addition, market acceptance and sales of our product candidates will depend significantly on the availability of adequate coverage and reimbursement from third-party payors for our product candidates and may be affected by existing and future healthcare reform measures.

Third-party payors, whether domestic or foreign, or governmental or commercial, are developing increasingly sophisticated methods of controlling healthcare costs. In both the United States and certain foreign jurisdictions, there have been a number of legislative and regulatory changes to the healthcare system that could impact our ability to sell our products profitably. In particular, in 2010, the Affordable Care Act was enacted. The Affordable Care Act and its implementing regulations, among other things, revised the methodology by which rebates owed by manufacturers to the state and federal government for covered outpatient drugs and certain biologics, including our product candidates, under the Medicaid Drug Rebate Program are calculated, increased the minimum Medicaid rebates owed by most manufacturers under the Medicaid Drug Rebate Program, extended the Medicaid Drug Rebate Program to utilization of prescriptions of individuals enrolled in Medicaid managed care organizations, subjected manufacturers to new annual fees and taxes for certain branded prescription drugs and provided incentives to programs that increase the federal government’s comparative effectiveness research.

Members of the United States Congress and the Trump Administration have expressed an intent to pass legislation or adopt executive orders to fundamentally change or repeal parts of the Affordable Care Act. While Congress has not passed repeal legislation to date, the 2017 Tax Reform Act includes a provision repealing the individual insurance coverage mandate included in the Affordable Care Act, effective January 1, 2019. Further, on January 20, 2017, President Trump signed an Executive Order directing federal agencies with authorities and responsibilities under the Affordable Care Act to waive, defer, grant exemptions from, or delay the implementation of any provision of the Affordable Care Act that would impose a fiscal burden on states or a cost, fee, tax, penalty or regulatory burden on individuals, healthcare providers, health insurers, or manufacturers of pharmaceuticals or medical devices. On October 13, 2017, President Trump signed an Executive Order terminating the cost-sharing subsidies that reimburse insurers under the Affordable Care Act. Several state Attorneys General filed suit to stop the administration from terminating the subsidies, but their request for a restraining order was denied by a federal judge in California on October 25, 2017. In addition, the Centers for Medicare & Medicaid Services (CMS) within the U.S. Department of Health and Human Services has recently proposed regulations that would give states greater flexibility in setting benchmarks for insurers in the individual and small group marketplaces, which may have the effect of relaxing the essential health benefits required under the Affordable Care Act for plans sold through such marketplaces. There may be further changes to the Affordable Care Act as a result of new legislation or further executive, administrative or judicial action.

Other legislative changes have been proposed and adopted in the United States since the Affordable Care Act was enacted. In August 2011, the Budget Control Act of 2011, among other things, created measures for spending reductions by Congress. A Joint Select Committee on Deficit Reduction, tasked with recommending a targeted deficit reduction of at least $1.2 trillion for the years 2013 through 2021, was unable to reach required goals, thereby triggering the legislation’s automatic reduction to several government programs. This includes aggregate reductions of Medicare payments to providers up to 2% per fiscal year. In January 2013, President

Obama signed into law the American Taxpayer Relief Act of 2012 (the ATRA), which delayed for another two months the budget cuts mandated by these sequestration provisions of the Budget Control Act of 2011. In March 2013, the President signed an executive order implementing sequestration, and in April 2013, the 2% Medicare payment reductions went into effect. The ATRA also, among other things, reduced Medicare payments to several providers, including hospitals, imaging centers and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years.

The impact of recent healthcare reform legislation and other changes in the healthcare industry and in healthcare spending on us is currently unknown, and may adversely affect our business model.

Our revenue prospects could be affected by changes in healthcare spending and policy in the United States and abroad. We operate in a highly regulated industry and new laws, regulations or judicial decisions, or new interpretations of existing laws, regulations or decisions, related to healthcare availability, the method of delivery or payment for healthcare products and services could negatively impact our business, operations and financial condition.

There have been, and likely will continue to be, legislative and regulatory proposals at the foreign, federal and state levels directed at broadening the availability of healthcare and containing or lowering the cost of healthcare. We cannot predict the initiatives that may be adopted in the future, including repeal, replacement or significant revisions to the Affordable Care Act. The continuing efforts of the government, insurance companies, managed care organizations and other payors of healthcare services to contain or reduce costs of healthcare and/or impose price controls may adversely affect:

- the demand for our product candidates, if we obtain regulatory approval;
- our ability to set a price that we believe is fair for our products;
- our ability to obtain coverage and reimbursement approval for a product;
- our ability to generate revenue and achieve or maintain profitability;
- the level of taxes that we are required to pay; and
- the availability of capital.

Any reduction in reimbursement from Medicare or other government programs may result in a similar reduction in payments from private payors, which may adversely affect our future profitability.

Regulatory requirements in the United States and abroad governing gene therapy products have changed frequently and may continue to change in the future, which could negatively impact our ability to complete clinical trials and commercialize our product candidates in a timely manner, if at all.

Regulatory requirements in the United States and abroad governing gene therapy products have changed frequently and may continue to change in the future. FDA has established the Office of Tissues and Advanced Therapies within its Center for Biologics Evaluation and Research to consolidate the review of gene therapy and related products, and has established the Cellular, Tissue and Gene Therapies Advisory Committee, among others, to advise this review. Prior to submitting an IND, because of our use of a viral vector for our ACTR T cells, our clinical trials are subject to review by the NIH Office of Biotechnology Activities' (OBA's) Recombinant DNA Advisory Committee (RAC). As of April 2016, the updated NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules provide the opportunity for one or more oversight bodies, including Institutional Biosafety Committees, to request a public RAC review based on their own review of the protocol and NIH requirements. Regardless of the request for public review, the NIH makes its own assessment as to whether the protocol would significantly benefit from a public RAC review. The RAC's recommendations are shared with FDA and the oversight bodies. The RAC can delay the initiation of a clinical trial, even if FDA has reviewed the trial design and details and has not objected to its initiation or has notified the

sponsor that the study may begin. Conversely, FDA can put an IND on a clinical hold even if the RAC has provided a favorable review or has recommended against an in-depth, public review. Moreover, under guidelines published by the NIH, patient enrollment in our gene therapy clinical trials cannot begin until, among other things, the investigator for that clinical trial has received a letter from the OBA indicating that the protocol registration process has been completed. Upon receipt of the letter from OBA confirming completion of protocol registration the investigator may obtain final approval from the oversight bodies and patient enrollment may begin if all other applicable regulatory authorizations have been obtained.

If there is a public RAC review, the receipt of the final recommendation letter concludes the protocol registration process and then oversight body, or bodies, approval can be issued. In addition, adverse developments in clinical trials of CAR-T products conducted by others may cause FDA or other oversight bodies to change the requirements for approval of any of our product candidates.

These regulatory review committees and advisory groups and the new guidelines they promulgate may lengthen the regulatory review process, require us to perform additional studies or trials, increase our development costs, lead to changes in regulatory positions and interpretations, delay or prevent approval and commercialization of our product candidates or lead to significant post-approval limitations or restrictions. As we advance our product candidates, we will be required to consult with these regulatory and advisory groups and comply with applicable guidelines. If we fail to do so, we may be required to delay or discontinue development of such product candidates. These additional processes may result in a review and approval process that is longer than we otherwise would have expected. Delays as a result of an increased or lengthier regulatory approval process or further restrictions on the development of our product candidates can be costly and could negatively impact our or our collaborators' ability to complete clinical trials and commercialize our current and future product candidates in a timely manner, if at all.

Risks Related to Our Intellectual Property

We depend on intellectual property licensed from third parties and termination of any of these licenses could result in the loss of significant rights, which would harm our business.

We are dependent on patents, know-how and proprietary technology, both our own and licensed from others.

Under our collaboration agreement with Seattle Genetics for the development and commercialization of novel therapies for cancer, we depend on a license from Seattle Genetics for use of their proprietary antibodies. Additionally, aspects of the ACTR technology are subject to a license from St. Jude Children's Research Hospital (St. Jude's) and the National University of Singapore (NUS).

We are currently, and expect in the future to be, party to material license or collaboration agreements. These agreements typically impose numerous obligations, such as diligence and payment obligations. Any termination of these licenses could result in the loss of significant rights and could harm our ability to commercialize our product candidates. See "Business—Licenses and Third-Party Research Collaborations" for additional information regarding our license agreements. These licenses do and future licenses may include provisions that impose obligations and restrictions on us. For example, our license agreement with St. Jude's and NUS imposes some limitations on our ability to assign the license to a party other than an affiliate. This could delay or otherwise negatively impact a transaction that we may wish to enter into.

Disputes may also arise between us and our licensors regarding intellectual property subject to a license agreement, including:

- the scope of rights granted under the license agreement and other interpretation-related issues;
- whether and the extent to which our technology and processes infringe on intellectual property of the licensor that is not subject to the licensing agreement;

- our right to sublicense patent and other rights to third parties under collaborative development relationships;
- our diligence obligations with respect to the use of the licensed technology in relation to our development and commercialization of our product candidates, and what activities satisfy those diligence obligations; and
- the ownership of inventions and know-how resulting from the joint creation or use of intellectual property by our licensors and us and our partners.

If disputes over intellectual property that we have licensed prevent or impair our ability to maintain our current licensing arrangements on acceptable terms, we may be unable to successfully develop and commercialize the affected product candidates.

We are generally also subject to all of the same risks with respect to protection of intellectual property that we license, as we are for intellectual property that we own, which are described below. If we or our licensors fail to adequately protect this intellectual property, our ability to commercialize products could suffer.

If our efforts to protect the proprietary nature of the intellectual property related to our technologies are not adequate, we may not be able to compete effectively in our market.

We rely upon a combination of patents, confidentiality agreements, trade secret protection and license agreements to protect the intellectual property related to our technologies. Any disclosure to or misappropriation by third parties of our confidential proprietary information could enable competitors to quickly duplicate or surpass our technological achievements, thus eroding our competitive position in our market.

Currently, with the exception of one European patent obtained from our in-licensed patent portfolio, no other patents have issued from the patent applications that we own or in-license. We anticipate additional patent applications will be filed both in the United States and in other countries, as appropriate. However, we cannot predict:

- if and when patents will issue;
- the degree and range of protection any issued patents will afford us against competitors including whether third parties will find ways to invalidate or otherwise circumvent our patents;
- whether any of our intellectual property will provide any competitive advantage;
- whether or not others will obtain patents claiming aspects similar to those covered by our patents and patent applications; or
- whether we will need to initiate or defend litigation or administrative proceedings which may be costly whether we win or lose.

Composition of matter patents for biological and pharmaceutical products, such as ACTR-based product candidates, are generally considered to be the strongest form of intellectual property protection for those types of products, as such patents provide protection without regard to any method of use. We cannot be certain that the claims in our pending patent applications covering composition of matter of our product candidates will be considered patentable by the United States Patent and Trademark Office (USPTO), or by patent offices in foreign countries, or that the claims in any of our issued patents will be considered patentable by courts in the United States or foreign countries. Method of use patents protect the use of a product for the specified method. This type of patent does not prevent a competitor from making and marketing a product that is identical to our product for an indication that is outside the scope of the patented method. Moreover, even if competitors do not actively promote their product for our targeted indications, physicians may prescribe these products “off-label.” Although off-label prescriptions may induce or contribute to the infringement of method of use patents, the practice is common and such infringement is difficult to prevent or prosecute.

The strength of patents in the biotechnology and pharmaceutical field involves complex legal and scientific questions and can be uncertain. The patent applications that we own or in-license may fail to result in issued patents with claims that cover our product candidates or uses thereof in the United States or in other foreign countries. Even if the patents do successfully issue, third parties may challenge the validity, enforceability or scope thereof, which may result in such patents being narrowed, invalidated or held unenforceable. Furthermore, even if they are unchallenged, our patents and patent applications may not adequately protect our intellectual property or prevent others from designing around our claims. If the breadth or strength of protection provided by the patent applications we hold with respect to our product candidates is threatened, it could dissuade companies from collaborating with us to develop, and threaten our ability to commercialize, our product candidates. Further, if we encounter delays in our clinical trials, the period of time during which we could market our product candidates under patent protection would be reduced. Since patent applications in the United States and most other countries are confidential for a period of time after filing, we cannot be certain that we were the first to file any patent application related to our product candidates. Furthermore, for United States 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, to determine who was the first to invent any of the subject matter covered by the patent claims of our applications. Various post grant review proceedings, such as inter partes review and post grant review, are available for any interested third party to challenge the patentability of claims issued in patents to us. While these post grant review proceedings have been used less frequently to invalidate biotech patents, they have been successful regarding other technologies, and these relatively new procedures are still changing, and those changes might affect future results.

In addition to the protection afforded by patents, we seek to rely on trade secret protection, confidentiality agreements, and license agreements to protect proprietary know-how that is not patentable, processes for which patents are difficult to enforce and any other elements of our product discovery and development processes that involve proprietary know-how, information, or technology that is not covered by patents. Although we require all of our employees to assign their inventions to us, and require all of our employees, consultants, advisors and any third parties who have access to our proprietary know-how, information, or technology to enter into confidentiality agreements, we cannot be certain that our trade secrets and other confidential proprietary information will not be disclosed or that competitors will not otherwise gain access to our trade secrets or independently develop substantially equivalent information and techniques. Furthermore, the laws of some foreign countries do not protect proprietary rights to the same extent or in the same manner as the laws of the United States. As a result, we may encounter significant problems in protecting and defending our intellectual property both in the United States and abroad. If we are unable to prevent unauthorized material disclosure of our intellectual property to third parties, we will not be able to establish or maintain a competitive advantage in our market, which could materially adversely affect our business, operating results and financial condition.

Third-party claims of intellectual property infringement may prevent or delay our product discovery and development efforts.

Our commercial success depends in part on our avoiding infringement of the patents and proprietary rights of third parties. There is a substantial amount of litigation involving patents and other intellectual property rights in the biotechnology and pharmaceutical industries, as well as administrative proceedings for challenging patents, including interference, reexamination, and post grant review proceedings before the USPTO or oppositions and other comparable proceedings in foreign jurisdictions. Numerous U.S. and foreign issued patents and pending patent applications, which are owned by third parties, exist in the fields in which we are developing our product candidates. As the biotechnology and pharmaceutical industries expand and more patents are issued, the risk increases that our product candidates may give rise to claims of infringement of the patent rights of others.

Third parties may assert that we are employing their proprietary technology without authorization. Generally, conducting clinical trials and other development activities in the United States is not considered an act of infringement. If and when ACTR087 or another product candidate is approved by the FDA, a third party may then seek to enforce its patent by filing a patent infringement lawsuit against us. While we do not believe that any

claims that could otherwise materially adversely affect commercialization of our product candidates, if approved, are valid and enforceable, we may be incorrect in this belief, or we may not be able to prove it in a litigation. In this regard, patents issued in the U.S. by law enjoy a presumption of validity that can be rebutted only with evidence that is "clear and convincing," a heightened standard of proof. There may be third-party patents of which we are currently unaware with claims to materials, formulations, methods of manufacture or methods for treatment related to the use or manufacture of our product candidates. Because patent applications can take many years to issue, there may be currently pending patent applications which may later result in issued patents that our product candidates may infringe. In addition, third parties may obtain patents in the future and claim that use of our technologies infringes upon these patents. Moreover, we may fail to identify relevant patents or incorrectly conclude that a patent is invalid, not enforceable, exhausted, or not infringed by our activities. If any third-party patents were held by a court of competent jurisdiction to cover the manufacturing process of our product candidates, constructs or molecules used in or formed during the manufacturing process, or any final product itself, the holders of any such patents may be able to block our ability to commercialize the product candidate unless we obtained a license under the applicable patents, or until such patents expire or they are finally determined to be held invalid or unenforceable. Similarly, if any third-party patent were held by a court of competent jurisdiction to cover aspects of our formulations, processes for manufacture or methods of use, including combination therapy or patient selection methods, the holders of any such patent may be able to block our ability to develop and commercialize the product candidate unless we obtained a license or until such patent expires or is finally determined to be held invalid or unenforceable. In either case, such a license may not be available on commercially reasonable terms or at all. If we are unable to obtain a necessary license to a third-party patent on commercially reasonable terms, or at all, our ability to commercialize our product candidates may be impaired or delayed, which could in turn significantly harm our business.

Parties making claims against us may seek and obtain injunctive or other equitable relief, which could effectively block our ability to further develop and commercialize our product candidates. Defense of these claims, regardless of their merit, could involve substantial litigation expense and would be a substantial diversion of employee resources from our business. In the event of a successful claim of infringement against us, we may have to pay substantial damages, including treble damages and attorneys' fees for willful infringement, obtain one or more licenses from third parties, pay royalties or redesign our infringing products, which may be impossible or require substantial time and monetary expenditure. We cannot predict whether any such license would be available at all or whether it would be available on commercially reasonable terms. Furthermore, even in the absence of litigation, we may need or may choose to obtain licenses from third parties to advance our research or allow commercialization of our product candidates. We may fail to obtain any of these licenses at a reasonable cost or on reasonable terms, if at all. In that event, we would be unable to further develop and commercialize our product candidates, which could harm our business significantly.

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.

Presently we have rights to certain intellectual property, through licenses from third parties and under patent applications that we own or will own, related to ACTR087, ACTR707, and certain other product candidates. Because additional product candidates may require the use of proprietary rights held by third parties, the growth of our business will likely depend in part on our ability to acquire, in-license or use these proprietary rights. In addition, while we have patent rights directed to certain ACTR constructs we may not be able to obtain intellectual property to broad ACTR constructs.

Our product candidates may also require specific formulations to work effectively and efficiently and these rights may be held by others. Similarly, efficient production or delivery of our product candidates may also require specific compositions or methods, and the rights to these may be owned by third parties. 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. Even if we are able to obtain a license, it may be non-exclusive, thereby giving our competitors access to the same technologies licensed to us. In that event, we

may be required to expend significant time and resources to develop or license replacement technology. Moreover, the specific antibodies that will be used with our product candidates may be covered by the intellectual property rights of others.

The licensing and acquisition of third-party intellectual property rights is a competitive area, and companies, which may be more established, or 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 in order to commercialize our product candidates. More established companies may have a competitive advantage over us due to their size, cash resources and greater clinical development and commercialization capabilities.

We may be involved in lawsuits to protect or enforce our patents or the patents of our licensors, which could be expensive, time-consuming and unsuccessful.

Competitors may infringe our patents or the patents of our licensors. To counter infringement or unauthorized use, we may be required to file infringement claims, which can be expensive and time-consuming. In addition, in an infringement proceeding, a court may decide that one or more of our patents is not valid or is unenforceable, or may refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover the technology in question. An adverse result in any litigation or defense proceedings could put one or more of our patents at risk of being invalidated, held unenforceable, or interpreted narrowly and could put our patent applications at risk of not issuing. Defense of these claims, regardless of their merit, would involve substantial litigation expense and would be a substantial diversion of employee resources from our business. In the event of a successful claim of infringement against us, we may have to pay substantial damages, including treble damages and attorneys' fees for willful infringement, obtain one or more licenses from third parties, pay royalties or redesign our infringing products, which may be impossible or require substantial time and monetary expenditure.

Post-grant proceedings, including interference proceedings, provoked by third parties or brought by the USPTO may be necessary to determine the validity or priority of inventions with respect to our patents or those of our licensors. An unfavorable outcome could result in a loss of our current patent rights and could require us to cease using the related technology or to attempt to license rights to it from the prevailing party. Our business could be harmed if the prevailing party does not offer us a license on commercially reasonable terms. Litigation or post-grant proceedings may result in a decision adverse to our interests and, even if we are successful, may result in substantial costs and distract our management and other employees. We may not be able to prevent, alone or with our licensors, misappropriation of our trade secrets or confidential information, particularly in countries where the laws may not protect those rights as fully as in the United States.

Furthermore, 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. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock.

Obtaining and maintaining our patent protection depends on compliance with various procedural, document submission, fee payment and other requirements imposed by governmental patent agencies, and our patent protection could be reduced or eliminated for non-compliance with these requirements.

Periodic maintenance fees on any issued patent are due to be paid to the USPTO and foreign patent agencies in several stages over the lifetime of the patent. The USPTO and various foreign governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process. While an inadvertent lapse can in many cases be cured by payment of a late fee or by other means in accordance with the applicable rules, there are situations in which noncompliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in

the relevant jurisdiction. Noncompliance events that could result in abandonment or lapse of a patent or patent application include, but are not limited to, failure to respond to official actions within prescribed time limits, non-payment of fees and failure to properly legalize and submit formal documents. In such an event, our competitors might be able to enter the market, which would have a material adverse effect on our business.

Issued patents covering our product candidates could be found invalid or unenforceable if challenged in court or the USPTO.

If we or one of our licensing partners initiate legal proceedings against a third party to enforce a patent covering one of our product candidates, the defendant could counterclaim that the patent covering our product candidate, as applicable, is invalid and/or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity and/or unenforceability are commonplace, and there are numerous grounds upon which a third party can assert invalidity or unenforceability of a patent. Third parties may also raise similar claims before administrative bodies in the United States or abroad, even outside the context of litigation. Such mechanisms include re-examination, *inter parties* review, post grant review, and equivalent proceedings in foreign jurisdictions (e.g., opposition proceedings). Such proceedings could result in revocation or amendment to our patents in such a way that they no longer cover our product candidates. The outcome following legal assertions of invalidity and unenforceability is unpredictable. With respect to the validity question, for example, we cannot be certain that there is no invalidating prior art, of which we, our patent counsel and the patent examiner were unaware during prosecution. If a defendant were to prevail on a legal assertion of invalidity and/or unenforceability, we would lose at least part, and perhaps all, of the patent protection on our product candidates. Such a loss of patent protection could have a material adverse impact on our business.

Changes in U.S. patent law could diminish the value of patents in general, thereby impairing our ability to protect our products.

As is the case with other biopharmaceutical companies, our success is heavily dependent on intellectual property, particularly patents. Obtaining and enforcing patents in the biopharmaceutical industry involve both technological and legal complexity, and is therefore costly, time-consuming and inherently uncertain. In addition, the United States continues to adapt to wide-ranging patent reform legislation that became effective starting in 2012. Moreover, recent U.S. Supreme Court rulings have narrowed the scope of patent protection available in certain circumstances and weakened the rights of patent owners in certain situations. 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 patents, once obtained. Depending on decisions by the U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change in unpredictable ways that would weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future. Changes in the laws and regulations governing patents in other jurisdictions could similarly have an adverse effect on our ability to obtain and effectively enforce our patent rights.

We have less robust foreign intellectual property rights and may not be able to protect our intellectual property rights throughout the world.

Certain of our key patent families (covering the ACTR087 construct) have been filed in the United States, as well as in numerous jurisdictions outside the United States, and we plan to similarly pursue subgeneric claims prior to expiration of applicable deadlines (including a patent family covering the ACTR707 construct). However, we have less robust intellectual property rights outside the United States, and, in particular, we may not be able to pursue generic coverage of the ACTR platform outside of the United States. Filing, prosecuting and defending patents on product candidates in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States can be less extensive than those in the United States. 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. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products and further, may export otherwise infringing products to territories where we have patent protection, but enforcement is not as strong as that in the United States. These products may compete with our products and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing. Most of our patent portfolio is at the very early stage. We will need to decide whether and in which jurisdictions to pursue protection for the various inventions in our portfolio prior to applicable deadlines.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents, trade secrets and other intellectual property protection, particularly those relating to biopharmaceutical products, which could make it difficult for us to stop the infringement of our patents or marketing of competing products in violation of our proprietary rights generally. 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, could put our patents at risk of being invalidated or interpreted narrowly and our patent applications at risk of not issuing and could 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, if any, may not be commercially meaningful. 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 be subject to claims challenging the inventorship or ownership of our patents and other intellectual property.

We generally enter into confidentiality and intellectual property assignment agreements with our employees, consultants, and contractors. These agreements generally provide that inventions conceived by the party in the course of rendering services to us will be our exclusive property. However, those agreements may not be honored and may not effectively assign intellectual property rights to us. Moreover, there may be some circumstances, where we are unable to negotiate for such ownership rights. Disputes regarding ownership or inventorship of intellectual property can also arise in other contexts, such as collaborations and sponsored research. If we are subject to a dispute challenging our rights in or to patents or other intellectual property, such a dispute could be expensive and time consuming. If we were unsuccessful, we could lose valuable rights in intellectual property that we regard as our own.

We may be subject to claims that our employees, consultants or independent contractors have wrongfully used or disclosed confidential information of third parties.

We have received confidential and proprietary information from third parties. In addition, we employ individuals who were previously employed at other biotechnology or pharmaceutical companies. We may be subject to claims that we or our employees, consultants or independent contractors have inadvertently or otherwise used or disclosed confidential information of these third parties or our employees' former employers or our consultants' or contractors' current or former clients or customers. Litigation may be necessary to defend against these claims. Even if we are successful in defending against these claims, litigation could result in substantial cost and be a distraction to our management and employees. If we are not successful, we could lose access or exclusive access to valuable intellectual property.

Numerous factors may limit any potential competitive advantage provided by our intellectual property rights.

The degree of future protection afforded by our intellectual property rights, whether owned or in-licensed, is uncertain because intellectual property rights have limitations, and may not adequately protect our business, provide a barrier to entry against our competitors or potential competitors, or permit us to maintain our

competitive advantage. Moreover, if a third party has intellectual property rights that cover the practice of our technology, we may not be able to fully exercise or extract value from our intellectual property rights. The following examples are illustrative:

- pending patent applications that we own or license may not lead to issued patents;
- patents, should they issue, that we own or license, may not provide us with any competitive advantages, or may be challenged and held invalid or unenforceable;
- others may be able to develop and/or practice technology that is similar to our technology or aspects of our technology but that is not covered by the claims of any of our owned or in-licensed patents, should any such patents issue;
- third parties may compete with us in jurisdictions where we do not pursue and obtain patent protection;
- we (or our licensors) might not have been the first to make the inventions covered by a pending patent application that we own or license;
- we (or our licensors) might not have been the first to file patent applications covering a particular invention;
- others may independently develop similar or alternative technologies without infringing our intellectual property rights;
- we may not be able to obtain and/or maintain necessary licenses on reasonable terms or at all;
- third parties may assert an ownership interest in our intellectual property and, if successful, such disputes may preclude us from exercising exclusive rights, or any rights at all, over that intellectual property;
- we may not be able to maintain the confidentiality of our trade secrets or other proprietary information;
- we may not develop or in-license additional proprietary technologies that are patentable; and
- the patents of others may have an adverse effect on our business.

Should any of these events occur, they could significantly harm our business and results of operation.

Risks Related to This Offering and Ownership of our Common Stock

We do not know whether an active, liquid, and orderly trading market will develop for our common stock or what the market price of our common stock will be and, as a result, it may be difficult for you to sell your shares of our common stock.

Prior to this offering, there was no public trading market for shares of our common stock. Although our common stock has been approved for listing on The Nasdaq Global Select Market, an active trading market for our shares may never develop or be sustained following this offering. You may not be able to sell your shares quickly or at the market price if trading in shares of our common stock is not active. The initial public offering price for our common stock was determined through negotiations with the underwriters, and the negotiated price may not be indicative of the market price of the common stock after the offering. As a result of these and other factors, you may be unable to resell your shares of our common stock at or above the initial public offering price. Further, an inactive market may also impair our ability to raise capital by selling shares of our common stock and may impair our ability to enter into strategic partnerships or acquire companies or products by using our shares of common stock as consideration.

The price of our stock may be volatile, and you could lose all or part of your investment.

The trading price of our common stock following this offering is likely to be highly volatile and could be subject to wide fluctuations in response to various factors, some of which are beyond our control, including

limited trading volume. In addition to the factors discussed in this "Risk Factors" section and elsewhere in this prospectus, these factors include:

- the commencement, enrollment, or results of the clinical trials of our product candidates or any future clinical trials we may conduct, or changes in the development status of our product candidates;
- any delay in our regulatory filings for our product candidates and any adverse development or perceived adverse development with respect to the applicable regulatory authority's review of such filings, including without limitation the FDA's issuance of a "refusal to file" letter or a request for additional information;
- adverse results or delays in clinical trials;
- our decision to initiate a clinical trial, not to initiate a clinical trial, or to terminate an existing clinical trial;
- adverse regulatory decisions, including failure to receive regulatory approval of our product candidates;
- changes in laws or regulations applicable to our products, including but not limited to clinical trial requirements for approvals;
- adverse developments concerning our manufacturers;
- our inability to obtain adequate product supply for any approved product or inability to do so at acceptable prices;
- our inability to establish collaborations if needed;
- our failure to commercialize our product candidates;
- additions or departures of key scientific or management personnel;
- unanticipated serious safety concerns related to the use of our product candidates;
- introduction of new products or services offered by us or our competitors;
- announcements of significant acquisitions, strategic partnerships, joint ventures, or capital commitments by us or our competitors;
- our ability to effectively manage our growth;
- the size and growth of our initial cancer target markets;
- our ability to successfully treat additional types of cancers or at different stages;
- actual or anticipated variations in quarterly operating results;
- our cash position;
- our failure to meet the estimates and projections of the investment community or that we may otherwise provide to the public;
- publication of research reports about us or our industry, or immunotherapy in particular, or positive or negative recommendations or withdrawal of research coverage by securities analysts;
- changes in the market valuations of similar companies;
- overall performance of the equity markets;
- sales of our common stock by us or our stockholders in the future;
- trading volume of our common stock;
- changes in accounting practices;

- ineffectiveness of our internal controls;
- disputes or other developments relating to proprietary rights, including patents, litigation matters, and our ability to obtain patent protection for our technologies;
- significant lawsuits, including patent or stockholder litigation;
- general political and economic conditions; and
- other events or factors, many of which are beyond our control.

In addition, the stock market in general, and The Nasdaq Global Select Market and biopharmaceutical companies in particular, have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of these companies. Broad market and industry factors may negatively affect the market price of our common stock, regardless of our actual operating performance. If the market price of our common stock after this offering does not exceed the initial public offering price, you may not realize any return on your investment in us and may lose some or all of your investment. In the past, securities class action litigation has often been instituted against companies following periods of volatility in the market price of a company's securities. This type of litigation, if instituted, could result in substantial costs and a diversion of management's attention and resources, which would harm our business, operating results, or financial condition.

We do not intend to pay dividends on our common stock, so any returns will be limited to the value of our stock.

We currently anticipate that we will retain future earnings for the development, operation, and expansion of our business and do not anticipate declaring or paying any cash dividends for the foreseeable future. In addition, pursuant to our loan and security agreement with PWB, we are prohibited from paying cash dividends without PWB's prior written consent, and any future debt financing arrangement may contain terms prohibiting or limiting the amount of dividends that may be declared or paid on our common stock. Any return to stockholders will therefore be limited to the appreciation of their stock, which may never occur.

Our principal stockholders and management own a significant percentage of our stock and will be able to exert significant influence over matters subject to stockholder approval.

Prior to this offering and the concurrent private placement, our executive officers, directors, and 5% stockholders beneficially owned approximately 79.4% of our voting stock as of January 31, 2018, and, assuming the sale by us of 5,770,000 shares of common stock in this offering and 416,666 shares of common stock in the concurrent private placement, that same group will hold approximately 63.5% of our outstanding voting stock (assuming no exercise of the underwriters' option to purchase additional shares). Certain of our existing stockholders, including affiliates of our directors, have agreed to purchase an aggregate of approximately $27.1 million of shares of our common stock in this offering at the initial public offering price. The foregoing discussion does not give effect to any purchases by these stockholders in this offering. Therefore, even after this offering and the concurrent private placement, these stockholders will have the ability to influence us through this ownership position. These stockholders may be able to determine all matters requiring stockholder approval. For example, these stockholders may be able to control elections of directors, amendments of our organizational documents, or approval of any merger, sale of assets, or other major corporate transaction. This may prevent or discourage unsolicited acquisition proposals or offers for our common stock that you may feel are in your best interest as one of our stockholders.

If you purchase our common stock in this offering, you will incur immediate and substantial dilution in the book value of your shares.

The initial public offering price is substantially higher than the net tangible book value per share of our common stock. Investors purchasing common stock in this offering will pay a price per share that substantially

exceeds the book value of our tangible assets after subtracting our liabilities. As a result, investors purchasing common stock in this offering will incur immediate dilution of $8.80 per share, based on the initial public offering price of $12.00 per share. Further, investors purchasing common stock in this offering will contribute approximately 45.7% of the total amount invested by stockholders since our inception, but will own only approximately 19.5% of the total number of shares of our common stock outstanding after this offering and the concurrent private placement.

This dilution is due to our investors who purchased shares prior to this offering having paid substantially less when they purchased their shares than the price offered to the public in this offering and the exercise of stock options granted to our employees. To the extent that outstanding stock options are exercised, there will be further dilution to new investors. As a result of the dilution to investors purchasing common stock in this offering, investors may receive significantly less than the purchase price paid in this offering, if anything, in the event of our liquidation. For a further description of the dilution that you will experience immediately after this offering and the concurrent private placement, see “Dilution.”

We are an emerging growth company, and we cannot be certain if the reduced reporting requirements applicable to emerging growth companies will make our common stock less attractive to investors.

We are an emerging growth company, as defined in the Jumpstart Our Business Startups Act (JOBS Act) enacted in April 2012. For as long as we continue to be an emerging growth company, we may take advantage of exemptions from various reporting requirements that are applicable to other public companies that are not emerging growth companies, including not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, as amended (Sarbanes-Oxley Act), reduced disclosure obligations regarding executive compensation in this prospectus and our periodic reports and proxy statements, and exemptions from the requirements of holding nonbinding advisory votes on executive compensation and stockholder approval of any golden parachute payments not previously approved. We could be an emerging growth company for up to five years following the year in which we complete this offering, although circumstances could cause us to lose that status earlier. We will remain an emerging growth company until the earlier of (1) the last day of the fiscal year (a) following the fifth anniversary of the closing of this offering, (b) in which we have total annual gross revenue of at least $1.07 billion, or (c) in which we are deemed to be a large accelerated filer, which requires the market value of our common stock that is held by non-affiliates to exceed $700 million as of the prior June 30th, and (2) the date on which we have issued more than $1 billion in non-convertible debt during the prior three-year 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 not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act and reduced disclosure obligations regarding executive compensation in this prospectus and our periodic reports and proxy statements. We cannot predict if investors will find our common stock less attractive because we may 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 more volatile.

Under the JOBS Act, emerging growth companies can also delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have irrevocably elected to “opt out” of this exemption from new or revised accounting standards and, therefore, will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies. As a result, changes in rules of U.S. generally accepted accounting principles or their interpretation, the adoption of new guidance, or the application of existing guidance to changes in our business could significantly affect our financial position and results of operations.

We will incur significant 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.

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 reporting requirements of the Securities Exchange Act of 1934, as amended, which will require, among other things, that we file with the Securities and Exchange Commission (the SEC), annual, quarterly, and current reports with respect to our business and financial condition. In addition, the Sarbanes-Oxley Act, as well as rules subsequently adopted by the SEC and The Nasdaq Global Select Market to implement provisions of the Sarbanes-Oxley Act, impose significant requirements on public companies, including requiring establishment and maintenance of effective disclosure and financial controls and changes in corporate governance practices. Further, in July 2010, the Dodd-Frank Wall Street Reform and Consumer Protection Act (the Dodd-Frank Act), was enacted. There are significant corporate governance and executive compensation related provisions in the Dodd-Frank Act that require the SEC to adopt additional rules and regulations in these areas, such as “say on pay” and proxy access. Recent legislation permits emerging growth companies to implement many of these requirements over a longer period and up to five years from the pricing of this offering. We intend to take advantage of this new legislation but cannot guarantee that we will not be required to implement these requirements sooner than budgeted or planned and thereby incur unexpected expenses. Stockholder activism, the current political environment, and the current high level of government intervention and regulatory reform may lead to substantial new regulations and disclosure obligations, which may lead to additional compliance costs and impact the manner in which we operate our business in ways we cannot currently anticipate.

We expect the rules and regulations applicable to public companies to substantially increase our legal and financial compliance costs and to make some activities more time-consuming and costly. If these requirements divert the attention of our management and personnel from other business concerns, they could have a material adverse effect on our business, financial condition, and results of operations. The increased costs will decrease our net income or increase our net loss and may require us to reduce costs in other areas of our business or increase the prices of our products or services. For example, we expect these rules and regulations to make it more difficult and more expensive for us to obtain director and officer liability insurance and we may be required to incur substantial costs to maintain the same or similar coverage. We cannot predict or estimate the amount or timing of additional costs we may incur to respond to these requirements. The impact of these requirements could also make it more difficult for us to attract and retain qualified persons to serve on our board of directors, our board committees, or as executive officers.

Sales of a substantial number of shares of our common stock by our existing stockholders in the public market could cause our stock price to fall.

If our existing stockholders sell, or indicate an intention to sell, substantial amounts of our common stock in the public market after the lock-up and other legal restrictions on resale discussed in this prospectus lapse, the trading price of our common stock could decline. Based on the number of shares of common stock outstanding as of January 31, 2018, upon the closing of this offering and the concurrent private placement, we will have outstanding a total of 29,617,718 shares of common stock. Of these shares, only the shares of common stock sold in this offering by us, plus any shares sold upon exercise of the underwriters’ option to purchase additional shares, will be freely tradable without restriction in the public market immediately following this offering, unless purchased by our affiliates. Morgan Stanley & Co. LLC and Cowen and Company, LLC, however, may, in their sole discretion, permit our officers, directors, and other stockholders who are subject to these lock-up agreements to sell shares prior to the expiration of the lock-up agreements.

Certain of our existing stockholders, including affiliates of our directors, have agreed to purchase an aggregate of approximately $27.1 million of shares of our common stock in this offering at the initial public offering price. Any such shares purchased by stockholders who are considered to be our affiliates cannot be resold in the public market immediately following this offering as a result of restrictions under securities laws,

but will be able to be sold following the expiration of these restrictions as described in the "Shares Eligible for Future Sale" section of this prospectus.

The lock-up agreements pertaining to this offering will expire 180 days from the date of this prospectus. In addition, shares of common stock that are either subject to outstanding options or reserved for future issuance under our 2018 Stock Option and Incentive Plan (2018 Plan) 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 (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.

After this offering and the concurrent private placement, the holders of 13,646,028 shares of our common stock, inclusive of 416,666 shares of our common stock purchased by Seattle Genetics in the concurrent private placement, as of January 31, 2018 will be entitled to rights with respect to the registration of their shares under the Securities Act, subject to the 180-day lock-up agreements described above. See "Description of Capital Stock—Registration Rights." Registration of these shares under the Securities Act would result in the shares becoming freely tradable without restriction under the Securities Act, except for shares held by affiliates, as defined in Rule 144 under the Securities Act. Any sales of securities by these stockholders could have a material adverse effect on the trading price of our common stock.

Future sales and issuances of our common stock or rights to purchase common stock, including pursuant to our 2018 Plan, could result in additional dilution of the percentage ownership of our stockholders and could cause our stock price to fall.

We expect that significant additional capital may be needed in the future to continue our planned operations, including conducting clinical trials, commercialization efforts, expanded research and development activities, and costs associated with operating as a public company. To raise capital, we may sell common stock, convertible securities, or other equity securities in one or more transactions at prices and in a manner we determine from time to time. If we sell common stock, convertible securities, or other equity securities, investors may be materially diluted by subsequent sales. Such sales may also result in material dilution to our existing stockholders, and new investors could gain rights, preferences, and privileges senior to the holders of our common stock, including shares of common stock sold in this offering.

Pursuant to the 2018 Plan, which became effective upon the date immediately preceding the date of the effectiveness of the registration statement of which this prospectus is a part, our management is authorized to grant stock options to our employees, directors, and consultants.

Initially, the aggregate number of shares of our common stock that may be issued pursuant to stock awards under the 2018 Plan is 2,547,558 shares, plus the shares of common stock remaining available for issuance under our 2015 Stock Incentive Plan. The number of shares of our common stock reserved for issuance under the 2018 Plan shall be cumulatively increased on January 1, 2019 and each January 1 thereafter by 4% of the total number of shares of our common stock outstanding on December 31 of the preceding calendar year or a lesser number of shares determined by our board of directors. Unless our board of directors elects not to increase the number of shares available for future grant each year, our stockholders may experience additional dilution, which could cause our stock price to fall.

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

Our management will have broad discretion in the application of the net proceeds from this offering and the concurrent private placement, including for any of the purposes described in the section entitled "Use of Proceeds," and you will not have the opportunity as part of your investment decision to assess whether the net

proceeds are being used appropriately. Because of the number and variability of factors that will determine our use of the net proceeds from this offering and the concurrent private placement, their ultimate use may vary substantially from their currently intended use. Our management might not apply our net proceeds in ways that ultimately increase or maintain the value of your investment. We intend to use the net proceeds from this offering and the concurrent private placement, together with our existing cash, cash equivalents, and marketable securities, to advance ACTR087 used in combination with rituximab for adult patients with r/r B cell non-Hodgkin lymphoma through the completion of our ongoing Phase I clinical trial; to fund a Phase II clinical trial of ACTR087 used in combination with rituximab for adult patients with r/r non-Hodgkin lymphoma who received prior CD19 CAR-T therapy; to advance ACTR707 used in combination with rituximab for adult patients with r/r B cell non-Hodgkin lymphoma through the completion of our Phase I clinical trial; to advance ACTR707 used in combination with trastuzumab through submission of an IND and to fund our Phase I clinical trial for this product candidate; and to develop product candidates in earlier stages of development and any additional product candidates that we select, to expand headcount and internal capabilities, and for working capital and other general corporate purposes. The failure by our management to apply these funds effectively could harm our business. Pending their use, we may invest the net proceeds from this offering in short-term, investment-grade, interest-bearing instruments, and U.S. government securities. These investments may not yield a favorable return to our stockholders. If we do not invest or apply the net proceeds from this offering and the concurrent private placement in ways that enhance stockholder value, we may fail to achieve expected financial results, which could cause our stock price to decline.

Anti-takeover provisions under our charter documents and Delaware law could delay or prevent a change of control, which could limit the market price of our common stock and may prevent or frustrate attempts by our stockholders to replace or remove our current management.

Our amended and restated certificate of incorporation and amended and restated bylaws, which are to become effective upon the closing of this offering and the concurrent private placement, will contain provisions that could delay or prevent a change of control of our company or changes in our board of directors that our stockholders might consider favorable. Some of these provisions include:

- a board of directors divided into three classes serving staggered three-year terms, such that not all members of the board will be elected at one time;
- a prohibition on stockholder action through written consent, which requires that all stockholder actions be taken at a meeting of our stockholders;
- a requirement that special meetings of stockholders be called only by the chairperson of the board of directors, the chief executive officer, or by a majority of the total number of authorized directors;
- advance notice requirements for stockholder proposals and nominations for election to our board of directors;
- a requirement 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 not less than two-thirds of all outstanding shares of our voting stock then entitled to vote in the election of directors;
- a requirement of approval of not less than two-thirds of all outstanding shares of our voting stock to amend any bylaws by stockholder action or to amend specific provisions of our certificate of incorporation; and
- the authority of the board of directors to issue preferred stock on terms determined by the board of directors without stockholder approval and which preferred stock may include rights superior to the rights of the holders of common stock.

In addition, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporate Law, which may prohibit certain business combinations with stockholders

owning 15% or more of our outstanding voting stock. These anti-takeover provisions and other provisions in our amended and restated certificate of incorporation and amended and restated bylaws could make it more difficult for stockholders or potential acquirers to obtain control of our board of directors or initiate actions that are opposed by the then-current board of directors and could also delay or impede a merger, tender offer, or proxy contest involving our company. These provisions could also discourage proxy contests and make it more difficult for you and other stockholders to elect directors of your choosing or cause us to take other corporate actions you desire. Any delay or prevention of a change of control transaction or changes in our board of directors could cause the market price of our common stock to decline.

Our amended and restated certificate of incorporation will provide 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 certificate of incorporation will provide that the Court of Chancery of the State of Delaware will be the exclusive forum for any derivative action or proceeding brought on our behalf, any action asserting a breach of fiduciary duty, any action asserting a claim against us arising pursuant to the Delaware General Corporation Law, our amended and restated certificate of incorporation or our amended and restated bylaws, any action to interpret, apply, enforce, or determine the validity of our certificate of incorporation or bylaws or any action asserting a claim against us that is governed by the internal affairs doctrine. The choice of 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. Alternatively, if a court were to find the choice of forum provision contained in our certificate of incorporation to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could adversely affect our business and financial condition.

If we fail to establish and maintain proper and effective internal control over financial reporting, our operating results and our ability to operate our business could be harmed.

Ensuring that we have adequate internal financial and accounting controls and procedures in place so that we can produce accurate financial statements on a timely basis is a costly and time-consuming effort that needs to be re-evaluated frequently. Our internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements in accordance with generally accepted accounting principles. In connection with this offering, we intend to begin the process of documenting, reviewing, and improving our internal controls and procedures for compliance with Section 404 of the Sarbanes-Oxley Act, which will require annual management assessment of the effectiveness of our internal control over financial reporting. We have begun recruiting additional finance and accounting personnel with certain skill sets that we will need as a public company.

Implementing any appropriate changes to our internal controls may distract our officers and employees, entail substantial costs to modify our existing processes, and take significant time to complete. These changes may not, however, be effective in maintaining the adequacy of our internal controls, and any failure to maintain that adequacy, or consequent inability to produce accurate financial statements on a timely basis, could increase our operating costs and harm our business. In addition, investors' perceptions that our internal controls are inadequate or that we are unable to produce accurate financial statements on a timely basis may harm our stock price and make it more difficult for us to effectively market and sell our service to new and existing customers.

If securities or industry analysts do not publish research or publish inaccurate or unfavorable research about our business, our stock price and trading volume could decline.

The trading market for our common stock will depend in part on the research and reports that securities or industry analysts publish about us or our business. Securities and industry analysts do not currently, and may never, publish research on our company. If no securities or industry analysts commence coverage of our company, the trading price for our stock would likely be negatively impacted. In the event securities or industry analysts initiate coverage, if one or more of the analysts who covers us downgrades our stock or publishes inaccurate or unfavorable research about our business, our stock price may decline. If one or more of these analysts ceases coverage of our company or fails to publish reports on us regularly, demand for our stock could decrease, which might cause our stock price and trading volume to decline.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus, including the sections entitled "Prospectus Summary," "Risk Factors," "Management's Discussion and Analysis of Financial Condition and Results of Operations," and "Business," contains express or implied forward-looking statements that are based on our management's belief and assumptions and on information currently available to our management. Although we believe that the expectations reflected in these forward-looking statements are reasonable, these statements relate to future events or our future operational or financial performance, and involve known and unknown risks, uncertainties, and other factors that may cause our actual results, performance, or achievements to be materially different from any future results, performance, or achievements expressed or implied by these forward-looking statements. Forward-looking statements in this prospectus include, but are not limited to, statements about:

- the success, cost, and timing of our product development activities and clinical trials;
- our ability to obtain and maintain regulatory approval for our ACTR087 and ACTR707 product candidates and any other product candidates we may develop, and any related restrictions, limitations, and/or warnings in the label of an approved product candidate;
- the potential for our identified research priorities to advance our ACTR platform;
- the ability to license additional intellectual property relating to our product candidates from third-parties and to comply with our existing license agreements and collaboration agreements;
- the ability and willingness of our third-party research institution collaborators to continue research and development activities relating to our product candidates;
- our ability to commercialize our products in light of the intellectual property rights of others;
- our ability to obtain funding for our operations, including funding necessary to complete further development and commercialization of our product candidates;
- the scalability and commercial viability of our manufacturing methods and processes;
- the commercialization of our product candidates, if approved;
- our plans to research, develop, and commercialize our product candidates;
- the potential benefits of our existing collaboration with Seattle Genetics and our ability to attract other collaborators with development, regulatory, and commercialization expertise;
- future agreements with third parties in connection with the commercialization of our product candidates and any other approved product;
- the size and growth potential of the markets for our product candidates, and our ability to serve those markets;
- the rate and degree of market acceptance of our product candidates;
- the pricing and reimbursement of our product candidates, if approved;
- regulatory developments in the United States and foreign countries;
- our ability to contract with third-party suppliers and manufacturers and their ability to perform adequately;
- the success of competing therapies that are or may become available;
- our ability to attract and retain key scientific or management personnel;
- the accuracy of our estimates regarding expenses, future revenue, capital requirements, and needs for additional financing;

- our expectations regarding the period during which we qualify as an emerging growth company under the JOBS Act;
- our use of the proceeds from this offering and the concurrent private placement; and
- our expectations regarding our ability to obtain and maintain intellectual property protection for our product candidates.

In some cases, forward-looking statements can be identified by terminology, such as “may,” “should,” “expects,” “intends,” “plans,” “anticipates,” “believes,” “estimates,” “predicts,” “potential,” “continue,” or the negative of these terms or other comparable terminology. These statements are only predictions. You should not place undue reliance on forward-looking statements because they involve known and unknown risks, uncertainties, and other factors, which are, in some cases, beyond our control and which could materially affect results. Factors that may cause actual results to differ materially from current expectations include, among other things, those listed under “Risk Factors” and elsewhere in this prospectus. If one or more of these risks or uncertainties occur, or if our underlying assumptions prove to be incorrect, actual events or results may vary significantly from those implied or projected by the forward-looking statements. No forward-looking statement is a guarantee of future performance. You should read this prospectus and the documents that we reference in this prospectus and have filed with the Securities and Exchange Commission as exhibits to the registration statement, of which this prospectus is a part, completely and with the understanding that our actual future results may be materially different from any future results expressed or implied by these forward-looking statements.

The forward-looking statements in this prospectus represent our views as of the date of this prospectus. We anticipate that subsequent events and developments will cause our views to change. However, while we may elect to update these forward-looking statements at some point in the future, we have no current intention of doing so except to the extent required by applicable law. You should therefore not rely on these forward-looking statements as representing our views as of any date subsequent to the date of this prospectus.

USE OF PROCEEDS

We estimate that our net proceeds from the sale of shares of our common stock in this offering will be approximately $61.6 million, or $71.3 million if the underwriters exercise in full their option to purchase additional shares, after deducting underwriting discounts and commissions and estimated offering expenses payable by us.

Seattle Genetics, Inc. has agreed to purchase from us, concurrently with this offering in a private placement, $5.0 million of shares of our common stock at a price per share equal to the initial public offering price. Our proceeds from the concurrent private placement will be $5.0 million. See "Concurrent Private Placement."

We currently estimate that we will use the net proceeds from this offering and the concurrent private placement, together with our existing cash, cash equivalents, and marketable securities, as follows:

- approximately $20 million to advance ACTR087 used in combination with rituximab for adult patients with r/r B cell non-Hodgkin lymphoma through the completion of our ongoing Phase I clinical trial;
- approximately $9 million to fund through 2019 a Phase II clinical trial of ACTR087 used in combination with rituximab for adult patients with r/r non-Hodgkin lymphoma who received prior CD19 CAR-T therapy;
- approximately $8 million to advance ACTR707 used in combination with rituximab for adult patients with r/r B cell non-Hodgkin lymphoma through the completion of our Phase I clinical trial;
- approximately $16 million to advance ACTR707 used in combination with trastuzumab through submission of an IND and to fund through 2019 our Phase I clinical trial for this product candidate; and
- the remainder to develop product candidates in earlier stages of development and any additional product candidates that we select, to expand headcount and internal capabilities, and for working capital and other general corporate purposes.

Based on our current plans, we believe that the net proceeds from this offering and the concurrent private placement, together with our existing cash, cash equivalents, and marketable securities, will be sufficient to fund our operations through at least December 2019.

This expected use of the net proceeds from this offering and the concurrent private placement represents our intentions based upon our current plans and business conditions. 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 and the concurrent private placement or the amounts that we will actually spend on the uses set forth above. The amounts and timing of our actual expenditures and the extent of clinical development may vary significantly depending on numerous factors, including the progress of our development, the status of and results from preclinical studies or 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 and the concurrent private placement.

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

DIVIDEND POLICY

We have never declared or paid cash dividends on our capital stock. We intend to retain all available funds and any future earnings to fund the growth and development of our business. We do not intend to pay cash dividends to our stockholders in the foreseeable future. In addition, pursuant to our loan and security agreement with Pacific West Bank (PWB), we are prohibited from paying cash dividends without the prior written consent of PWB. Moreover, any future indebtedness that we may incur could preclude us from paying dividends. Any future determination to pay dividends will be made at the discretion of our board of directors. Investors should not purchase our common stock with the expectation of receiving cash dividends.

CAPITALIZATION

The following table sets forth our cash, cash equivalents, and marketable securities and our capitalization as of December 31, 2017:

- on an actual basis;
- on a pro forma basis to give effect to the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 13,229,362 shares of common stock upon the closing of this offering and the filing and effectiveness of our amended and restated certificate of incorporation; and
- on a pro forma as adjusted basis to give further effect to (i) our issuance and sale of 5,770,000 shares of our common stock in this offering at the initial public offering price of $12.00 per share, after deducting underwriting discounts and commissions and estimated offering expenses payable by us, and (ii) the issuance and sale by us in the concurrent private placement of 416,666 shares of common stock to Seattle Genetics, Inc., based on the initial public offering price.

You should read this table together with our consolidated financial statements and the related notes appearing elsewhere in this prospectus and the "Selected Consolidated Financial Data" and "Management's Discussion and Analysis of Financial Condition and Results of Operations" sections of this prospectus.

	As of December 31, 2017		
	Actual	Pro Forma	Pro Forma As Adjusted
	(in thousands, except share and per share data)		
Cash, cash equivalents, and marketable securities	$ 40,961	$ 40,961	$ 108,343
Redeemable convertible preferred stock (Series A and B), $0.001 par value; 20,791,407 shares authorized, 20,771,850 shares issued and outstanding, actual; no shares authorized, issued or outstanding, pro forma and pro forma as adjusted	$ 77,151	$ —	$ —
Stockholders' equity (deficit):			
Preferred stock, $0.001 par value; no shares authorized, issued or outstanding, actual; 10,000,000 shares authorized and no shares issued or outstanding, pro forma and pro forma as adjusted	—	—	—
Common stock, $0.001 par value; 60,040,000 shares authorized, 10,201,690 shares issued and outstanding, actual; 150,000,000 shares authorized, 23,431,052 shares issued and outstanding, pro forma; 150,000,000 shares authorized, 29,617,718 shares issued and outstanding, pro forma as adjusted	10	23	30
Additional paid-in capital	2,499	79,637	146,223
Accumulated other comprehensive loss	(16)	(16)	(16)
Accumulated deficit	(51,339)	(51,339)	(51,339)
Total stockholders' equity (deficit)	(48,846)	28,305	94,898
Total capitalization	$ 28,305	$ 28,305	$ 94,898

The table above does not include:

- 3,156,939 shares of our common stock issuable upon the exercise of stock options outstanding as of December 31, 2017, at a weighted average exercise price of $4.01 per share;
- 976,475 shares of our common stock available for future issuance as of December 31, 2017 under our 2015 Stock Incentive Plan, as amended, which were made available for issuance under our 2018 Stock Option and Incentive Plan (2018 Plan) upon effectiveness of the 2018 Plan;

- 2,547,558 shares of our common stock reserved for future issuance under our 2018 Plan, which became effective upon the date immediately preceding the date of the effectiveness of the registration statement of which this prospectus is a part (of which we have granted options to purchase an aggregate of 777,071 shares of our common stock, with an exercise price per share equal to the initial public offering price in this offering, to certain of our employees and non-employee directors in connection with this offering); and
- 314,000 shares of our common stock reserved for future issuance under our 2018 Employee Stock Purchase Plan, which became effective upon the effectiveness of the registration statement of which this prospectus is a part.

DILUTION

If you invest in our common stock in this offering, your ownership interest will be diluted immediately 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.

Our historical net tangible book value (deficit) as of December 31, 2017 was $(50.2) million, or $(4.92) per share of common stock. Our historical net tangible book value (deficit) is the amount of our total tangible assets less our total liabilities and the carrying value of our preferred stock, which is not included within stockholders' equity (deficit). Historical net tangible book value (deficit) per share represents historical net tangible book value (deficit) divided by the 10,201,690 shares of common stock outstanding as of December 31, 2017.

Our pro forma net tangible book value as of December 31, 2017 was $26.9 million, or $1.15 per share of common stock. Pro forma net tangible book value represents the amount of our total tangible assets less our total liabilities, after giving effect to the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 13,229,362 shares of common stock upon the closing of this offering. Pro forma net tangible book value per share represents pro forma net tangible book value divided by the total number of shares outstanding as of December 31, 2017, after giving effect to the pro forma adjustment described above.

After giving further effect to (i) our issuance and sale of 5,770,000 shares of our common stock in this offering at the initial public offering price of $12.00 per share, after deducting underwriting discounts and commissions and estimated offering expenses payable by us, and (ii) the issuance and sale by us in the concurrent private placement of 416,666 shares of common stock to Seattle Genetics, Inc. at the initial public offering price, our pro forma as adjusted net tangible book value as of December 31, 2017 would have been $94.9 million, or $3.20 per share. This represents an immediate increase in pro forma as adjusted net tangible book value per share of $2.05 to existing stockholders and immediate dilution of $8.80 in pro forma as adjusted net tangible book value per share to new investors purchasing common stock in this offering. Dilution per share to new investors is determined by subtracting pro forma as adjusted net tangible book value per share after this offering and the concurrent private placement from the initial public offering price per share paid by new investors. The following table illustrates this dilution on a per share basis:

Initial public offering price per share		$12.00
Historical net tangible book value (deficit) per share as of December 31, 2017	$(4.92)	
Increase per share attributable to the pro forma adjustment described above	6.07	
Pro forma net tangible book value per share as of December 31, 2017	1.15	
Increase in pro forma as adjusted net tangible book value per share attributable to new investors purchasing common stock in this offering and the concurrent private placement	2.05	
Pro forma as adjusted net tangible book value per share after this offering and the concurrent private placement		3.20
Dilution per share to new investors purchasing common stock in this offering		$8.80

If the underwriters exercise their option to purchase additional shares in full, our pro forma as adjusted net tangible book value per share after this offering and the concurrent private placement would be $3.43, representing an immediate increase in pro forma as adjusted net tangible book value per share of $2.28 to existing stockholders and immediate dilution in pro forma as adjusted net tangible book value per share of $8.57 to new investors purchasing common stock in this offering, based on the initial public offering price of $12.00 per share and after deducting underwriting discounts and commissions and estimated offering expenses payable by us.

The following table summarizes, as of December 31, 2017, 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 and the concurrent private placement, based on the initial public offering price of $12.00 per share, before deducting 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	Percentage	
Existing stockholders	23,431,052	79.1%	$ 77,357,203	51.0%	$ 3.30
Concurrent private placement investor	416,666	1.4	4,999,992	3.3	$ 12.00
New investors	5,770,000	19.5	69,240,000	45.7	$ 12.00
Total	29,617,718	100.0%	$151,597,195	100.0%	

Certain of our existing stockholders, including affiliates of our directors, have agreed to purchase an aggregate of approximately $27.1 million of shares of our common stock in this offering at the initial public offering price. The table above does not reflect the purchase by such stockholders in this offering.

The table above assumes no exercise of the underwriters' option to purchase additional shares in this offering. If the underwriters' option to purchase additional shares is exercised in full, the number of shares of our common stock held by existing stockholders would be reduced to 76.9% of the total number of shares of our common stock outstanding after this offering and the concurrent private placement, and the number of shares of common stock held by new investors purchasing common stock in this offering would be increased to 21.8% of the total number of shares of our common stock outstanding after this offering and the concurrent private placement.

The number of shares purchased from us by existing stockholders is based on 23,431,052 shares of our common stock outstanding as of December 31, 2017, after giving effect to the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 13,229,362 shares of common stock upon the closing of this offering, and excludes:

- 3,156,939 shares of our common stock issuable upon the exercise of stock options outstanding as of December 31, 2017, at a weighted average exercise price of $4.01 per share;
- 976,475 shares of our common stock available for future issuance as of December 31, 2017 under our 2015 Stock Incentive Plan, as amended, which were made available for issuance under our 2018 Stock Option and Incentive Plan (2018 Plan) upon effectiveness of the 2018 Plan;
- 2,547,558 shares of our common stock reserved for future issuance under our 2018 Plan, which became effective upon the date immediately preceding the date of the effectiveness of the registration statement of which this prospectus is a part (of which we have granted options to purchase an aggregate of 777,071 shares of our common stock, with an exercise price per share equal to the initial public offering price in this offering, to certain of our employees and non-employee directors in connection with this offering); and
- 314,000 shares of our common stock reserved for future issuance under our 2018 Employee Stock Purchase Plan, which became effective upon the effectiveness of the registration statement of which this prospectus is a part.

To the extent that 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 appearing elsewhere in this prospectus and the "Management's Discussion and Analysis of Financial Condition and Results of Operations" section of this prospectus. We have derived the consolidated statement of operations data for the years ended December 31, 2015, 2016, and 2017 and the consolidated balance sheet data as of December 31, 2016 and 2017 from our audited consolidated financial statements appearing elsewhere in this prospectus. Our historical results are not necessarily indicative of the results that may be expected in the future.

	Year Ended December 31,		
	2015	2016	2017
	(in thousands, except per share data)		
Consolidated Statement of Operations Data:			
Collaboration revenue	$ 2,986	$ 6,355	$ 8,360
Operating expenses:			
Research and development	6,852	21,992	29,832
General and administrative	2,726	3,433	4,680
Total operating expenses	9,578	25,425	34,512
Loss from operations	(6,592)	(19,070)	(26,152)
Other income (expense):			
Interest income	—	265	386
Other income, net	—	681	274
Total other income, net	—	946	660
Net loss	(6,592)	(18,124)	(25,492)
Accretion of redeemable convertible preferred stock to redemption value	(43)	(64)	(65)
Net loss attributable to common stockholders	$ (6,635)	$ (18,188)	$ (25,557)
Net loss per share attributable to common stockholders, basic and diluted(1)	$ (0.65)	$ (1.78)	$ (2.51)
Weighted average common shares outstanding, basic and diluted(1)	10,190	10,190	10,192
Pro forma net loss per share attributable to common stockholders, basic and diluted (unaudited)(2)			$ (1.09)
Pro forma weighted average common shares outstanding, basic and diluted (unaudited)(2)			23,421

(1) See Note 13 to our consolidated financial statements appearing elsewhere in this prospectus for details on the calculation of basic and diluted net loss per share attributable to common stockholders.

(2) See Note 13 to our consolidated financial statements appearing elsewhere in this prospectus for details on the calculation of basic and diluted pro forma net loss per share attributable to common stockholders.

	As of December 31,	
	2016	2017
	(in thousands)	
Consolidated Balance Sheet Data:		
Cash, cash equivalents, and marketable securities	$ 68,508	$ 40,961
Working capital(1)	60,995	31,189
Total assets	75,550	49,115
Redeemable convertible preferred stock	77,086	77,151
Total stockholders' deficit	(24,698)	(48,846)

(1) We define working capital as current assets less current liabilities.

MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

You should read the following discussion and analysis of our financial condition and results of operations together with the "Selected Consolidated Financial Data" section of this prospectus and our consolidated financial statements and related notes appearing elsewhere in this prospectus. Some of the information contained in this discussion and analysis or set forth elsewhere in this prospectus, including information with respect to our plans and strategy for our business and related financing, includes forward-looking statements that involve risks and uncertainties. As a result of many factors, including those factors set forth in the "Risk Factors" section of this prospectus, our actual results could differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis.

Overview

We are a clinical-stage biopharmaceutical company focused on the development and commercialization of novel immunotherapy products designed to harness the power of a patient's immune system to cure cancer. Our proprietary technology, called antibody-coupled T cell receptor (ACTR), is a universal, engineered cell therapy that is intended to be used in combination with a wide range of tumor-specific antibodies to target different tumor types. Our product candidates are composed of ACTR T cells co-administered with approved and commercially available antibodies or antibodies in preclinical or clinical development. Our vision is to use our ACTR platform to transform cancer treatment and deliver patient cures in many different hematologic and solid tumor cancers, improving upon current cell therapies.

In our ongoing Phase I clinical trial using our lead ACTR construct, ACTR087, to treat adult patients with relapsed or refractory non-Hodgkin lymphoma (r/r NHL), we have demonstrated clinical proof of concept, as evidenced by ACTR T cell expansion and persistence, a favorable tolerability profile at the first dose level, and anti-tumor activity. We recently completed patient enrollment into the dose escalation phase of this trial and are advancing towards testing in an expanded patient cohort using an optimized dose of ACTR087 to support potential registration trials.

Since our inception in 2014, we have focused significant efforts and financial resources on building our ACTR platform, establishing and protecting our intellectual property portfolio, conducting research and development of our product candidates, manufacturing drug product material for use in preclinical studies and clinical trials, staffing our company, and raising capital. We do not have any products approved for sale and have not generated any revenue from product sales. To date, we have funded our operations with proceeds from the sales of preferred stock and payments received under our collaboration agreement with Seattle Genetics, Inc. (Seattle Genetics). Through December 31, 2017, we had received gross proceeds of $77.3 million from the sales of our preferred stock and $32.5 million under our collaboration agreement with Seattle Genetics. Since our inception, we have incurred significant operating losses. Our ability to generate product revenue sufficient to achieve profitability will depend heavily on the successful development and eventual commercialization of one or more of our product candidates. For the years ended December 31, 2015, 2016, and 2017, we reported net losses of $6.6 million, $18.1 million, and $25.5 million, respectively. As of December 31, 2017, we had an accumulated deficit of $51.3 million. We expect to continue to incur significant expenses and increasing operating losses for at least the next several years. We expect that our expenses and capital requirements will increase substantially in connection with our ongoing activities, particularly if and as we:

- conduct additional clinical trials for our product candidates;
- continue to discover and develop additional product candidates;
- acquire or in-license other product candidates and technologies;
- maintain, expand, and protect our intellectual property portfolio;
- hire additional clinical, scientific, and commercial personnel;

- establish manufacturing capabilities in-house;
- establish a commercial manufacturing source and secure supply chain capacity sufficient to provide commercial quantities of any product candidates for which we may obtain regulatory approval;
- seek regulatory approvals for any product candidates that successfully complete clinical trials;
- establish a sales, marketing, and distribution infrastructure to commercialize any products for which we may obtain regulatory approval; and
- add operational, financial, and management information systems and personnel, including personnel to support our product development and planned future commercialization efforts, as well as to support our transition to a public reporting company.

We will not generate revenue from product sales unless and until we successfully complete clinical development and obtain regulatory approval for our product candidates. If we obtain regulatory approval for any of our product candidates and do not enter into a commercialization partnership, we expect to incur significant expenses related to developing our internal commercialization capability to support product sales, marketing, and distribution. Further, upon the closing of this offering, we expect to incur additional costs associated with operating as a public company.

As a result, we will need substantial additional funding to support our continuing operations and pursue our growth strategy. Until such time as we can generate significant revenue from product sales, if ever, we expect to finance our operations through a combination of equity offerings, debt financings, collaborations, strategic alliances, and marketing, distribution, or licensing arrangements. We may be unable to raise additional funds or enter into such other agreements or arrangements when needed on favorable terms, or at all. If we fail to raise capital or enter into such agreements as, and when, needed, we may have to significantly delay, scale back, or discontinue the development and commercialization of one or more of our product candidates.

Because of the numerous risks and uncertainties associated with pharmaceutical product development, we are unable to accurately 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 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 unable to continue our operations at planned levels and be forced to reduce or terminate our operations.

As of December 31, 2017, we had cash, cash equivalents, and marketable securities of $41.0 million and available borrowings under our loan and security agreement of $15.0 million. We believe that the net proceeds from this offering and the concurrent private placement, together with our existing cash, cash equivalents, and marketable securities, will enable us to fund our operating expenses and capital expenditure requirements through at least December 2019, without considering available borrowings under our loan and security agreement. See “—Liquidity and Capital Resources” and “Concurrent Private Placement.”

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 the sale of products in the near future. If our development efforts for our product candidates are successful and result in regulatory approval or additional license or collaboration agreements with third parties, we may generate revenue in the future from a combination of product sales or payments from additional collaboration or license agreements that we may enter into with third parties. We expect that our revenue for the next several years will be derived primarily from a collaboration we entered into with Seattle Genetics in June 2015 as well as any additional collaborations that we may enter into in the future. We cannot provide assurance as to the timing of future milestone or royalty payments or that we will receive any of these payments at all.

Collaboration with Seattle Genetics, Inc.

Our revenue during the years ended December 31, 2015, 2016, and 2017 was derived from our collaboration agreement with Seattle Genetics.

In June 2015, we entered into a collaboration agreement with Seattle Genetics whereby we and Seattle Genetics agreed to jointly develop two product candidates incorporating our ACTR platform and Seattle Genetics' antibodies. We received an upfront payment of $25.0 million and an equity investment of $5.0 million in the form of Series B preferred stock, with terms consistent with those of other investors that purchased our Series B preferred stock in June 2015. The equity investment of $5.0 million was made at fair value and was considered to be distinct from the collaboration agreement. The agreement included an option, held by Seattle Genetics, to expand the collaboration to include a third product candidate upon payment of an additional fee. This option expired unexercised in June 2017.

Under the agreement, we will conduct preclinical research and clinical development activities related to the two specified product candidates through Phase I clinical development, and Seattle Genetics will provide all of the funding for those activities. Seattle Genetics will continue development activities of the two specified product candidates in collaboration with us unless it exercises one of its two options to opt-out from further development and commercialization activities for each of the two product candidates during specified periods subsequent to Phase I clinical development. In addition, we have an option to opt-out from further development and commercialization activities for each of the two product candidates, exercisable during a specified period subsequent to Phase II clinical development. If neither party exercises its options to opt-out from further development and commercialization activities for each product candidate, the parties will work together to co-develop and fund each product candidate after Phase I clinical development and Seattle Genetics will pay us specified collaboration and milestone payments upon the occurrence of specified events related to each product candidate. As of December 31, 2017, we were eligible to receive future collaboration and milestone payments under the collaboration agreement of up to an aggregate of $400.0 million across the two active product candidates, consisting of $100.0 million of aggregate collaboration payments, $100.0 million of aggregate regulatory milestone payments, and $200.0 million of aggregate commercial milestone payments. The individual collaboration payments are payable upon the occurrence of specified clinical development events and range up to $30.0 million per product candidate. The individual regulatory milestone payments are payable upon the first regulatory approval of each product in the United States and the first regulatory approval of each product in specified territories outside the United States and range up to $35.0 million per product. The individual commercial milestone payments are payable upon the achievement of specified aggregate annual net sales for each product and range up to $60.0 million per product.

In the event that a party exercises its option to opt-out from further development and commercialization of a product candidate, the parties will negotiate in good faith the payment obligations of the continuing party to the opt-out party for that product candidate. Unless either party exercises its right to opt-out from further development and commercialization activities, we and Seattle Genetics will co-commercialize and share profits and losses equally on any co-developed products in the United States. Seattle Genetics will retain exclusive commercial rights outside of the United States and is obligated to pay us tiered royalties ranging in the high single-digit to mid-teens percentages based on net sales outside of the United States. The royalties are payable on a product-by-product basis and may be reduced in specified circumstances. Seattle Genetics will purchase ACTR T cells from us on a cost-plus basis for its commercial supply outside of the United States. We are recognizing the $25.0 million upfront payment as revenue on a straight-line basis over the estimated period of performance, which is the term of our preclinical research and clinical development activities related to the two specified product candidates through Phase I clinical development. As payments from Seattle Genetics are earned related to our preclinical research and clinical development activities through Phase I clinical development, we recognize as revenue the portion of the payments equal to the percentage of the elapsed research and development term to the total estimated research and development term, with the remaining portion of consideration received being recognized over the remaining estimated period of performance on a straight-line

basis. Our initial estimate of the period of performance was approximately 58 months, which as of December 31, 2017 had not changed.

Under the collaboration agreement, we recognized revenue of $3.0 million, $6.4 million, and $8.4 million for the years ended December 31, 2015, 2016, and 2017, respectively.

Effective January 1, 2018, we will be required to adopt a new revenue recognition standard, which will change the manner in which we recognize revenue from our collaboration agreement with Seattle Genetics. Under the new standard, we will recognize revenue from the collaboration agreement later in the performance period as a result of applying the cost-to-cost method, in contrast to recognizing revenue on a straight-line basis over the estimated 58-month performance period under the existing standard. See "—Critical Accounting Policies and Significant Judgments and Estimates—Revenue Recognition and Collaboration Agreements."

Operating Expenses

Research and Development Expenses

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

- employee-related expenses, including salaries, related benefits, and stock-based compensation expense for employees engaged in research and development functions;
- expenses incurred in connection with the preclinical and clinical development of our product candidates, including under agreements with third parties, such as consultants and contractors and contract research organizations (CROs);
- the cost of manufacturing drug products for use in our preclinical studies and clinical trials, including under agreements with third parties, such as consultants and contractors and contract manufacturing organizations (CMOs);
- laboratory supplies and animal care;
- facilities, depreciation, and other expenses, which include direct and allocated expenses for rent and maintenance of facilities and insurance; and
- payments made under third-party licensing agreements.

We expense research and development costs as incurred. Any nonrefundable advance payments that we make 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.

Our direct external research and development expenses are tracked on a program-by-program basis and consist of costs, such as fees paid to consultants, contractors, CMOs, and CROs in connection with our preclinical and clinical development activities. We do not allocate employee costs, costs associated with our discovery efforts, laboratory supplies, and facilities, including depreciation or other indirect costs, to specific product development programs because these costs are deployed across multiple product development programs and, as such, are not separately classified. The table below summarizes our research and development expenses incurred by development program:

	Year Ended December 31,		
	2015	2016	2017
	(in thousands)		
ACTR087 used in combination with rituximab	$ 2,139	$ 5,699	$ 6,457
ACTR707 used in combination with rituximab	—	—	2,179
ACTR087 used in combination with SEA-BCMA	—	—	1,884
Unallocated expenses	4,713	16,293	19,312
Total research and development expenses	$ 6,852	$ 21,992	$ 29,832

Product candidates in later stages of clinical development generally have higher development costs than those in earlier stages of clinical development, primarily due to the increased size and duration of later-stage clinical trials. We expect that our research and development expenses will increase substantially in connection with our planned clinical and preclinical development activities in the near term and in the future. At this time, we cannot reasonably estimate or know the nature, timing, and costs of the efforts that will be necessary to complete the preclinical and clinical development of any of our product candidates. The successful development and commercialization of our product candidates is highly uncertain. This is due to the numerous risks and uncertainties associated with product development and commercialization, including the following:

- the timing and progress of preclinical and clinical development activities;
- the number and scope of preclinical and clinical programs we decide to pursue;
- the progress of the development efforts of parties with whom we have entered, or may enter, into collaboration arrangements;
- our ability to maintain our current research and development programs and to establish new ones;
- our ability to establish new licensing or collaboration arrangements;
- the successful completion of clinical trials with safety, tolerability, and efficacy profiles that are satisfactory to the U.S. Food and Drug Administration (FDA) or any comparable foreign regulatory authority;
- the receipt of regulatory approvals from applicable regulatory authorities;
- the success in establishing and operating a manufacturing facility, or securing manufacturing supply through relationships with third parties;
- our ability to obtain and maintain patents, trade secret protection, and regulatory exclusivity, both in the United States and internationally;
- our ability to protect our rights in our intellectual property portfolio;
- the commercialization of our product candidates, if and when approved;
- the acceptance of our product candidates, if approved, by patients, the medical community, and third-party payors;
- competition with other products; and
- a continued acceptable safety profile of our therapies following approval.

A change in the outcome of any of these variables with respect to the development of any of our product candidates could significantly change the costs and timing associated with the development of that product candidate. We may never succeed in obtaining regulatory approval for any of our product candidates.

General and Administrative Expenses

General and administrative expenses consist primarily of salaries and related costs, including stock-based compensation, for personnel in executive, finance, and administrative functions. General and administrative expenses also include direct and allocated facility-related costs as well as professional fees for legal, patent, consulting, investor and public relations, accounting, and audit services. We anticipate that our general and administrative expenses will increase in the future as we increase our headcount to support our continued research activities and development of our product candidates. We also anticipate that we will incur increased accounting, audit, legal, regulatory, compliance, and director and officer insurance costs as well as investor and public relations expenses associated with operating as a public company.

Other Income (Expense)

Interest Income

Interest income consists of interest earned on our cash equivalents and marketable securities balances. Our interest income has not been significant due to low interest earned on invested balances.

Other Income, Net

Other income, net consists of miscellaneous income and expense unrelated to our core operations, primarily income from subleasing a portion of our headquarters facilities.

Income Taxes

Since our inception, we have not recorded any income tax benefits for the net losses we have incurred in each year or for our earned research and development tax credits, as we believe, based upon the weight of available evidence, that it is more likely than not that all of our net operating loss carryforwards and tax credits will not be realized. As of December 31, 2017, we had U.S. federal and state net operating loss carryforwards of $29.8 million and $31.0 million, respectively, which may be available to offset future income tax liabilities and begin to expire in 2035. As of December 31, 2017, we also had U.S. federal and state research and development tax credit carryforwards of $2.7 million and $1.0 million, respectively, which begin to expire in 2034 and 2029, respectively. 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 (TCJA) was signed into United States law. The TCJA includes a number of changes to existing tax law, including, among other things, a permanent reduction in the federal corporate income tax rate from 34% to 21%, effective as of January 1, 2018, as well as 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 tax rate change resulted in (i) a reduction in the gross amount of our deferred tax assets as of December 31, 2017, without an impact on the net amount of our deferred tax assets, which are recorded with a full valuation allowance, and (ii) no income tax expense or benefit being recognized as of the enactment date of the TCJA.

Results of Operations

Comparison of the Years Ended December 31, 2016 and 2017

The following table summarizes our results of operations for the years ended December 31, 2016 and 2017:

	Year Ended December 31,		
	2016	2017	Change
	(in thousands)		
Collaboration revenue	$ 6,355	$ 8,360	$ 2,005
Operating expenses:			
Research and development	21,992	29,832	7,840
General and administrative	3,433	4,680	1,247
Total operating expenses	25,425	34,512	9,087
Loss from operations	(19,070)	(26,152)	(7,082)
Other income (expense):			
Interest income	265	386	121
Other income, net	681	274	(407)
Total other income, net	946	660	(286)
Net loss	$ (18,124)	$ (25,492)	$(7,368)

Collaboration Revenue

Collaboration revenue recognized during the years ended December 31, 2016 and 2017 of $6.4 million and $8.4 million, respectively, was due to the recognition of a portion of the $25.0 million upfront payment received from Seattle Genetics under our collaboration agreement as well as reimbursements of research and development costs by Seattle Genetics, both of which are currently being recognized as revenue on a straight-line basis over the estimated period of performance of our research and development obligations.

Effective January 1, 2018, we will be required to adopt a new revenue recognition standard, which will change the manner in which we recognize revenue from our collaboration agreement with Seattle Genetics. See "—Critical Accounting Policies and Significant Judgments and Estimates—Revenue Recognition and Collaboration Agreements."

Research and Development Expenses

	Year Ended December 31,		
	2016	2017	Change
	(in thousands)		
Direct external research and development expenses by program:			
ACTR087 used in combination with rituximab	$ 5,699	$ 6,457	$ 758
ACTR707 used in combination with rituximab	—	2,179	2,179
ACTR087 used in combination with SEA-BCMA	—	1,884	1,884
Unallocated expenses:			
Personnel related (including stock-based compensation)	7,831	10,058	2,227
Laboratory supplies, facility related and other	8,462	9,254	792
Total research and development expenses	$ 21,992	$ 29,832	$7,840

Research and development expenses were $22.0 million for the year ended December 31, 2016, compared to $29.8 million for the year ended December 31, 2017. The increase in direct external costs related to our ACTR087 used in combination with rituximab program of $0.8 million was primarily due to an increase in

clinical trial costs related to our Phase I clinical trial of ACTR087 used in combination with rituximab, which we refer to as ATTCK-20-2, which commenced in the fourth quarter of 2016. Direct external costs incurred for our ACTR707 used in combination with rituximab and ACTR087 used in combination with SEA-BCMA programs primarily related to costs incurred in connection with the preparation of our investigational new drug application (IND) filings for those product candidates with the FDA in April 2017 and July 2017, respectively, and costs related to preparation for planned clinical trials. We are developing our ACTR087 used in combination with SEA-BCMA product candidate in conjunction with Seattle Genetics.

The increase in personnel-related costs of $2.2 million included in unallocated expenses was due to an increase in headcount in our research and development function, including personnel engaged in our Seattle Genetics collaboration. Personnel-related costs for the years ended December 31, 2016 and 2017 included stock-based compensation expense of $0.8 million and $1.2 million, respectively. The increase in laboratory supplies, facility-related, and other costs of $0.8 million was primarily due to increased facilities costs allocated to research and development as a result of the increase in headcount, manufacturing costs and increased consultant costs supporting all of our programs, and increased depreciation expense from equipment purchased in 2016, partially offset by a decrease in laboratory supplies resulting from costs incurred in 2016 to set up the laboratory that did not recur in 2017.

General and Administrative Expenses

General and administrative expenses for the year ended December 31, 2016 were $3.4 million, compared to $4.7 million for the year ended December 31, 2017. The increase in general and administrative expenses was primarily due to an increase in professional and consultant fees of $0.8 million related to increased patent costs, audit fees and a market research study and an increase in personnel-related costs of $0.3 million primarily as a result of an increase in compensation expense related to personnel in general and administrative functions.

Interest Income

Interest income for the year ended December 31, 2016 was $0.3 million, compared to $0.4 million for the year ended December 31, 2017. The increase in interest income was due to higher interest rates in 2017 than in 2016.

Other Income, Net

Other income, net for the year ended December 31, 2016 was $0.7 million, compared to $0.3 million for the year ended December 31, 2017. The decrease in other income, net was primarily due to a decrease in sublease income as the sublease of a portion of our facilities was for a smaller amount of space compared to the prior period.

Comparison of the Years Ended December 31, 2015 and 2016

The following table summarizes our results of operations for the years ended December 31, 2015 and 2016:

	Year Ended December 31, 2015	2016	Change
		(in thousands)	
Collaboration revenue	$ 2,986	$ 6,355	$ 3,369
Operating expenses:			
Research and development	6,852	21,992	15,140
General and administrative	2,726	3,433	707
Total operating expenses	9,578	25,425	15,847
Loss from operations	(6,592)	(19,070)	(12,478)
Other income (expense):			
Interest income	—	265	265
Other income, net	—	681	681
Total other income, net	—	946	946
Net loss	$ (6,592)	$ (18,124)	$ (11,532)

Collaboration Revenue

Collaboration revenue recognized during the years ended December 31, 2015 and 2016 of $3.0 million and $6.4 million, respectively, was due to the recognition of a portion of the $25.0 million upfront payment received from Seattle Genetics under our collaboration agreement as well as reimbursements of research and development costs by Seattle Genetics, both of which are being recognized as revenue on a straight-line basis over the estimated period of performance of our research and development obligations.

Research and Development Expenses

	Year Ended December 31, 2015	2016	Change
		(in thousands)	
Direct external research and development expenses by program:			
ACTR087 used in combination with rituximab	$ 2,139	$ 5,699	$ 3,560
Unallocated expenses:			
Personnel related (including stock-based compensation)	2,399	7,831	5,432
Laboratory supplies, facility related and other	2,314	8,462	6,148
Total research and development expenses	$ 6,852	$ 21,992	$ 15,140

Research and development expenses were $6.9 million for the year ended December 31, 2015, compared to $22.0 million for the year ended December 31, 2016. The increase in direct external costs related to our ACTR087 used in combination with rituximab program of $3.6 million was primarily due to costs incurred to support our IND filing for that product candidate with the FDA and initiation of our first dose level in Phase I of ATTCK-20-2, which commenced in the fourth quarter of 2016, including costs resulting from validation of the manufacturing process, further development of our formulation, and the manufacture of clinical supply.

The increase in personnel-related costs of $5.4 million included in unallocated expenses was due to an increase in headcount in our research and development function, including personnel engaged in our Seattle Genetics collaboration. Personnel-related costs for the years ended December 31, 2015 and 2016 included stock-based compensation expense of $0.1 million and $0.8 million, respectively. The increase in laboratory supplies, facility-related, and other costs of $6.1 million was primarily due to rent expense for our new laboratory space

and the increased costs of supporting a larger group of research and development personnel and their research efforts.

General and Administrative Expenses

General and administrative expenses for the year ended December 31, 2015 were $2.7 million, compared to $3.4 million for the year ended December 31, 2016. The increase in general and administrative expenses of $0.7 million was primarily due to an increase in personnel-related costs of $0.6 million as a result of an increase in headcount in our general and administrative function and an increase in facility-related costs of $0.3 million due primarily to rent expense for our new headquarters facilities, partially offset by a decrease in professional fees of $0.2 million.

Interest Income

Interest income for the year ended December 31, 2016 was $0.3 million. Interest income was due to interest earned on our cash equivalents and marketable securities. We did not invest our cash during 2015.

Other Income, Net

Other income, net for year ended December 31, 2016 was $0.7 million. Other income, net consisted primarily of income from subleasing a portion of our headquarters facilities.

Liquidity and Capital Resources

Since our inception, we have incurred significant operating losses. We have generated limited revenue to date from funding arrangements with our collaboration partner. We have not yet commercialized any of our product candidates and we do not expect to generate revenue from sales of any product candidates for several years, if at all. To date, we have funded our operations with proceeds from the sales of preferred stock and payments received under a collaboration agreement. Through December 31, 2017, we had received gross proceeds of $77.3 million from our sales of preferred stock and $32.5 million under our collaboration agreement. As of December 31, 2017, we had cash, cash equivalents, and marketable securities of $41.0 million and available borrowings under our loan and security agreement of $15.0 million.

Cash Flows

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

	Year Ended December 31,		
	2015	2016	2017
		(in thousands)	
Cash provided by (used in) operating activities	$ 17,716	$ (18,640)	$ (25,835)
Cash provided by (used in) investing activities	(3,249)	(30,429)	13,513
Cash provided by (used in) financing activities	70,752	(40)	(729)
Net increase (decrease) in cash and cash equivalents	$ 85,219	$ (49,109)	$ (13,051)

Operating Activities

During the year ended December 31, 2017, operating activities used $25.8 million of cash, primarily resulting from our net loss of $25.5 million and net cash used by changes in our operating assets and liabilities of $2.9 million, partially offset by net non-cash charges of $2.5 million. Net cash used by changes in our operating assets and liabilities for the year ended December 31, 2017 consisted primarily of a $3.9 million decrease in deferred revenue and an increase of $0.2 million in prepaid expenses and other current assets, partially offset by a $1.1 million increase in accounts payable and accrued expenses and other current liabilities.

During the year ended December 31, 2016, operating activities used $18.6 million of cash, primarily resulting from our net loss of $18.1 million and net cash used by changes in our operating assets and liabilities of $2.3 million, partially offset by net non-cash charges of $1.8 million. Net cash used by changes in our operating assets and liabilities for the year ended December 31, 2016 consisted primarily of a $3.1 million decrease in deferred revenue and a $0.6 million increase in accounts receivable, both partially offset by a $1.1 million increase in accounts payable and accrued expenses and other current liabilities and a $0.2 million increase in deferred rent.

During the year ended December 31, 2015, operating activities provided $17.7 million of cash, primarily resulting from net cash provided by changes in our operating assets and liabilities of $23.9 million and non-cash charges of $0.4 million, partially offset by our net loss of $6.6 million. Net cash provided by changes in our operating assets and liabilities for the year ended December 31, 2015 consisted of a $22.6 million increase in deferred revenue, a $1.2 million increase in accounts payable and accrued expenses and other current liabilities, and a $0.7 million increase in deferred rent, all partially offset by increases of $0.3 million in both accounts receivable and prepaid expenses and other current assets.

In June 2015, we received an upfront payment of $25.0 million from Seattle Genetics under our collaboration agreement. At that time, we recorded the $25.0 million as deferred revenue, to be subsequently recognized as revenue on a straight-line basis over our period of performance. Changes in deferred revenue in all periods were due to the initial recording of and increases to the amount of deferred revenue from payments from Seattle Genetics for reimbursements of research and development costs as well as the subsequent recognition as revenue of a portion of the deferred revenue.

Changes in accounts payable, accrued expenses, and prepaid expenses in all periods were generally due to growth in our business, the advancement of our product candidates, and the timing of vendor invoicing and payments.

Investing Activities

During the year ended December 31, 2017, net cash provided by investing activities was $13.5 million, consisting primarily of maturities and sales of marketable securities of $21.0 million, partially offset by purchases of marketable securities of $6.5 million and purchases of property and equipment of $0.9 million.

During the year ended December 31, 2016, net cash used by investing activities was $30.4 million, consisting primarily of purchases of marketable securities of $55.2 million and purchases of property and equipment of $3.3 million, partially offset by maturities and sales of marketable securities of $28.0 million.

During the year ended December 31, 2015, net cash used by investing activities was $3.2 million, consisting of purchases of property and equipment of $2.0 million and changes in restricted cash of $1.3 million. The change in restricted cash was due to a letter of credit associated with the lease of our headquarters facility entered into in 2015.

Financing Activities

During the year ended December 31, 2017, net cash used by financing activities was $0.7 million, consisting of payments of planned initial public offering costs of $0.8 million, partially offset by proceeds from the issuance of common stock upon stock option exercises of $0.1 million.

During the year ended December 31, 2016, net cash used by financing activities was less than $0.1 million, consisting of debt issuance costs related to our loan and security agreement.

During the year ended December 31, 2015, net cash provided by financing activities was $70.8 million, consisting of net proceeds from the sales of preferred stock.

Loan and Security Agreement

In January 2017, we entered into a loan and security agreement with Pacific West Bank, which provides for term loan borrowings of up to $15.0 million through January 19, 2019. Borrowings under the loan and security agreement bear interest at a variable annual rate equal to the greater of (i) the prime rate plus 0.25% or (ii) 3.75%, and are payable over an interest-only period until January 19, 2019, followed by a 24-month period of equal monthly payments of principal and interest. All amounts outstanding as of the maturity date of January 19, 2021 become immediately due and payable.

In connection with the loan and security agreement, we agreed to enter into warrant agreements with the lender pursuant to which warrants will be issued to purchase a number of shares of our capital stock equal to 1% of the amount of each term loan borrowing under the loan and security agreement, divided by the applicable exercise price.

No amounts had been borrowed as term loans under the loan and security agreement as of December 31, 2017 or March 2, 2018.

Borrowings under the loan and security agreement are collateralized by substantially all of our assets, except for our intellectual property. Under the loan and security agreement, we have agreed to affirmative and negative covenants to which we will remain subject until maturity. These covenants include limitations on our ability to incur additional indebtedness and engage in certain fundamental business transactions, such as mergers or acquisitions of other businesses. There are no financial covenants associated with the loan and security agreement. Events of default under the loan and security agreement include failure to make payments when due, insolvency events, failure to comply with covenants, and material adverse effects with respect to us.

Funding Requirements

We expect our expenses to increase substantially in connection with our ongoing activities, particularly as we advance the preclinical activities and clinical trials for our product candidates in development. In addition, upon the closing of this offering, we expect to incur additional costs associated with operating as a public company. The timing and amount of our operating expenditures will depend largely on:

- the commencement, enrollment, or results of the planned clinical trials of our product candidates or any future clinical trials we may conduct, or changes in the development status of our product candidates;
- any delay in our regulatory filings for our product candidates and any adverse development or perceived adverse development with respect to the applicable regulatory authority's review of such filings, including without limitation the FDA's issuance of a "refusal to file" letter or a request for additional information;
- adverse results or delays in clinical trials;
- our decision to initiate a clinical trial, not to initiate a clinical trial, or to terminate an existing clinical trial;
- adverse regulatory decisions, including failure to receive regulatory approval of our product candidates;
- changes in laws or regulations applicable to our products, including but not limited to clinical trial requirements for approvals;
- adverse developments concerning our manufacturers;
- our inability to obtain adequate product supply for any approved product or inability to do so at acceptable prices;
- our inability to establish collaborations if needed;

- our failure to commercialize our product candidates;
- additions or departures of key scientific or management personnel; and
- unanticipated serious safety concerns related to the use of our product candidates.

As of December 31, 2017, we had cash, cash equivalents, and marketable securities of $41.0 million and available borrowings under our loan and security agreement of $15.0 million. We believe that the net proceeds from this offering and the concurrent private placement, together with our existing cash, cash equivalents, and marketable securities, will enable us to fund our operating expenses and capital expenditure requirements through at least December 2019, without considering available borrowings under our loan and security agreement. We have based this estimate on assumptions that may prove to be wrong, and we could utilize our available capital resources sooner than we expect.

Until such time, if ever, as we can generate substantial product revenue, we expect to finance our operations through a combination of equity offerings, debt financings, collaborations, strategic alliances, and marketing, distribution, or licensing 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 acquisitions or capital expenditures, or declaring dividends. If we raise additional funds through collaborations, strategic alliances, or marketing, distribution, or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams, research programs or drug 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 or other arrangements when needed, we may be required to delay, limit, reduce, or terminate our research, product development, or future commercialization efforts, or grant rights to develop and market drug candidates that we would otherwise prefer to develop and market ourselves.

Contractual Obligations and Commitments

The following table summarizes our contractual obligations as of December 31, 2017 and the effects that such obligations are expected to have on our liquidity and cash flows in future periods:

	Payments Due by Period				
	Total	Less Than 1 Year	1 to 3 Years	4 to 5 Years	More Than 5 Years
	(in thousands)				
Operating lease commitments[1]	$10,361	$ 1,826	$ 3,811	$ 4,035	$ 689
Manufacturing commitment[2]	198	198	—	—	—
Total	$10,559	$ 2,024	$ 3,811	$ 4,035	$ 689

(1) Reflects payments due for our lease of office and laboratory space in Cambridge, Massachusetts under an operating lease agreement that expires in 2023.

(2) Reflects commitment for costs associated with our external CMO, which we engaged to manufacture drug product materials. Our manufacturing commitment includes non-cancelable minimum quantities to be purchased as of December 31, 2017.

Under our licensing agreement with National University of Singapore and St. Jude Children's Research Hospital, Inc., we have agreed to make milestone payments and pay royalties and annual license maintenance fees. We have not included any contingent payment obligations, such as milestones or royalties, in the table above as the amount, timing, and likelihood of such payments are not known. We have not included license maintenance fees in the table above because, although the amounts and timing are known, we cannot currently determine the final termination dates of the agreement and, as a result, we cannot determine the total amounts of

such payments we will be required to make under the agreement. Under the agreement, we are obligated to make aggregate milestone payments of up to 5.5 million Singapore dollars (equivalent to approximately $4.1 million as of December 31, 2017) upon the achievement of specified clinical and regulatory milestones and to pay tiered royalties ranging in the low single-digit percentages on annual net sales of licensed products sold by us or our sublicensees. Additionally, under certain circumstances, we are obligated to pay a percentage of amounts received from sublicensees to the licensors. License maintenance fees are payable on each anniversary of the effective date of the agreement and escalate from less than $0.1 million for each of the first seven years to $0.1 million on the eighth anniversary and each year thereafter.

We enter into contracts in the normal course of business with CROs and other third parties for clinical trials and preclinical research studies and testing. These contracts provide for termination upon notice. Payments due upon cancellation consist only of payments for services provided and expenses incurred, including non-cancelable obligations of our service providers, up to the date of cancellation. These payments are not included in the table of contractual obligations and commitments above.

Critical Accounting Policies and Significant Judgments and Estimates

Our consolidated financial statements are prepared in accordance with generally accepted accounting principles in the United States (GAAP). The preparation of our consolidated financial statements and related disclosures requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenue, costs and expenses, and the disclosure of contingent assets and liabilities in our 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 Note 2 to our consolidated financial statements appearing 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 financial statements.

Collaboration Agreements

We follow the accounting guidance for collaboration agreements, which requires that certain transactions between us and collaborators be recorded in our consolidated statements of operations and comprehensive loss on either a gross basis or net basis, depending on the characteristics of the collaborative relationship, and requires enhanced disclosure of collaborative relationships. We evaluate our collaboration agreements for proper classification in our consolidated statements of operations and comprehensive loss based on the nature of the underlying activity. If payments to and from collaborative partners are not within the scope of other authoritative accounting literature, the consolidated statements of operations classification for the payments is based on a reasonable, rational analogy to authoritative accounting literature that is applied in a consistent manner. When we have concluded that we have a customer relationship with one of our collaborators, such as that with Seattle Genetics, we follow the guidance in Accounting Standards Codification (ASC) Topic 605, *Revenue Recognition* (ASC 605). When we have concluded that we have a vendor relationship with one of our collaborators, we recognize any reimbursements received from these vendors as a reduction of the related expense incurred, in accordance with ASC 605-50, *Revenue Recognition—Customer Payments and Incentives*.

Revenue Recognition of Collaboration Agreements

We recognize revenue from license and collaboration agreements in accordance with ASC 605. Accordingly, revenue is recognized when all of the following criteria are met: persuasive evidence of an arrangement exists, delivery has occurred, or services have been rendered, the seller’s price to the buyer is fixed or determinable, and collectibility is reasonably assured.

When evaluating multiple-element arrangements, we consider whether the deliverables under the arrangement represent separate units of accounting. This evaluation requires subjective determinations and requires us to make judgments about the individual deliverables and whether such deliverables are separable from the other aspects of the contractual relationship. In determining the units of accounting, we evaluate certain criteria, including whether the deliverables have standalone value, based on the consideration of the relevant facts and circumstances for each arrangement. The consideration to be received under each arrangement is allocated to the separate units of accounting using the relative selling price method, and the applicable revenue recognition criteria are applied to each of the separate units. Deliverables are considered separate units of accounting provided that (i) the delivered item has value to the customer on a standalone basis and (ii) if the arrangement includes a general right of return with respect to the delivered item, delivery or performance of the undelivered items is considered probable and substantially in our control. In assessing whether an item has standalone value, we consider factors such as the research, development, manufacturing, and commercialization capabilities of the collaboration partner and the availability of the associated expertise in the general marketplace. In addition, we consider whether the collaboration partner can use any other deliverable for its intended purpose without the receipt of the remaining deliverables, whether the value of the deliverable is dependent on the undelivered items, and whether there are other vendors that can provide the undelivered items.

The consideration received under the arrangement that is fixed or determinable is then allocated among the separate units of accounting based on the relative selling prices of the separate units of accounting. We determine the selling price of a unit of accounting within each arrangement following the hierarchy of evidence prescribed by ASC 605-25. Accordingly, we determine the estimated selling price for units of accounting within each arrangement using vendor-specific objective evidence (VSOE) of selling price, if available; third-party evidence (TPE) of selling price, if VSOE is not available; or best estimate of selling price (BESP), if neither VSOE nor TPE is available. We typically use BESP to estimate the selling price as we generally do not have VSOE or TPE of selling price for our units of accounting. Determining the BESP for a unit of accounting requires significant judgment. In developing the BESP for a unit of accounting, we consider applicable market conditions and relevant entity-specific factors, including factors that were contemplated in negotiating the agreement with the customer and estimated costs. We validate the BESP for units of accounting by evaluating whether changes in the key assumptions used to determine the BESP will have a significant effect on the allocation of arrangement consideration between multiple units of accounting.

We recognize arrangement consideration allocated to each unit of accounting when all of the revenue recognition criteria in ASC 605 are met for that particular unit of accounting. In the event that a deliverable does not represent a separate unit of accounting, we recognize revenue from the combined unit of accounting over the contractual or estimated period of performance for the undelivered items, which is typically the term of our research and development obligations. If there is no discernible pattern of performance or objectively measurable performance measures do not exist, then we recognize revenue under the arrangement on a straight-line basis over the period we are expected to complete our performance obligations. Conversely, if the pattern of performance over which the service is provided to the customer can be determined at the inception of the arrangement and if objectively measurable performance measures exist, then we recognize revenue under the arrangement using the proportional performance method. Revenue recognized is limited to the lesser of the cumulative amount of payments received or the cumulative amount of revenue earned, as determined using the straight-line method or proportional performance method, as applicable, as of the end of each reporting period.

Significant management judgment is required in determining the level of effort required under an arrangement and the period over which we expect to complete our performance obligations under an arrangement. Steering committee services that are not inconsequential or perfunctory and that are determined to be performance obligations are combined with other research services or performance obligations required under an arrangement, if any, in determining the level of effort required in an arrangement and the period over which we expect to complete our aggregate performance obligations.

At the inception of an arrangement that includes options for a customer to purchase additional services or products at agreed upon prices in the future, we evaluate whether each option is substantive. Factors that we

consider in evaluating whether an option is substantive include the overall objective of the arrangement, if the exercise of that option represents a separate buying decision, and if the services or products subject to the option are essential to the functionality of the current deliverables. When an option is considered substantive, we do not consider the option or item underlying the option to be a deliverable at the inception of the arrangement, and the associated option fees are not included in the allocable arrangement consideration, assuming the option is not priced at a significant and incremental discount. When an option is not considered substantive, we would consider the option, including other deliverables contingent upon the exercise of the option, to be a deliverable at the inception of the arrangement and a corresponding amount would be included in the allocable arrangement consideration. In addition, if the price of the option includes a significant incremental discount, the discount inherent in the option price would be included as a deliverable at the inception of the arrangement.

At the inception of an arrangement that includes potential milestone payments, we evaluate whether each milestone is substantive and at risk to both parties on the basis of the contingent nature of the milestone. This evaluation includes an assessment of whether: (i) the consideration is commensurate with either our performance to achieve the milestone or the enhancement of the value of the delivered item as a result of a specific outcome resulting from our 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 arrangement. We evaluate factors such as the scientific, clinical, regulatory, commercial and other risks that must be overcome to achieve the particular milestone and the level of effort and investment required to achieve the particular milestone in making this assessment. There is considerable judgment involved in determining whether a milestone satisfies all of the criteria required to conclude that a milestone is substantive. We will recognize revenue in its entirety upon successful accomplishment of any substantive milestones, assuming all other revenue recognition criteria are met. Milestones that are not considered substantive are recognized as earned if there are no remaining performance obligations or over the remaining period of performance, with a cumulative catch-up being recognized for the elapsed portion of the period of performance, assuming all other revenue recognition criteria are met.

To date, we have not recorded any substantive milestones because no milestones that meet the required criteria listed above have been identified. Payments for achievement of non-substantive milestones are deferred and recognized as revenue over the estimated period of performance applicable to the collaboration agreement. As these milestones are achieved, we will recognize as revenue a portion of the milestone payment that is equal to the percentage of the period of performance completed when the milestone is achieved, multiplied by the amount of the milestone payment, upon achievement of such milestone. We will recognize the remaining portion of the milestone payment over the remaining period of performance under either the proportional performance method or on a straight-line basis.

Royalty revenue, if any, is recognized based on contractual terms 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.

Amounts received prior to satisfying the revenue recognition criteria listed above are recorded as deferred revenue in the accompanying consolidated balance sheets. Amounts expected to be recognized as revenue within 12 months of the balance sheet date are classified as current deferred revenue. Amounts not expected to be recognized as revenue within the following 12 months of the balance sheet date are classified as non-current deferred revenue.

In the event that a collaboration agreement were to be terminated and we had no further performance obligations, we would recognize as revenue any portion of the 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.

Effective January 1, 2018, we will be required to adopt Accounting Standard Codification Topic 606, *Revenue from Contracts with Customers* (ASC 606). The core principle of ASC 606 is that a company will

recognize revenue when it transfers promised goods or services to customers in an amount that reflects the consideration to which the company expects to be entitled in exchange for those goods or services. We have substantially completed our assessment of the impact that this new standard will have on our consolidated financial statements. While our assessment is preliminary, we expect the adoption will have a material impact on our consolidated financial statements, in particular, related to the pattern and timing of our revenue recognition of amounts from our collaboration agreement with Seattle Genetics. Under ASC 606, we will recognize revenue using the cost-to-cost method, which we believe best depicts the transfer of control to the customer. In contrast, under the existing revenue recognition standard, we are recognizing revenue on a straight-line basis over the estimated period of performance. Under the cost-to-cost method, the extent of progress towards completion is measured based on the ratio of actual costs incurred to the total estimated costs expected upon satisfying the identified performance obligation. Under this method, revenue will be recorded as a percentage of the estimated transaction price based on the extent of progress towards completion. In addition, under ASC 606, the estimated transaction price will include variable consideration for payments expected to be earned for preclinical research and clinical development activities through Phase I, which, under the existing standard, we were precluded from including in the estimated transaction price until such payments were determinable and due. The estimate of our measure of progress and estimate of variable consideration to be included in the transaction price will be updated at each reporting date as a change in estimate. The amount of transaction price allocated to the satisfied portion of the performance obligation, based on our measure of progress, will be recognized immediately on a cumulative catch-up basis, resulting in an adjustment to revenue in the period of change. The amount related to the unsatisfied portion will be recognized as that portion is satisfied over time.

We plan to adopt ASC 606 using the modified retrospective transition method, which will result in an adjustment to accumulated deficit in our consolidated balance sheet as of the January 1, 2018 effective date for the cumulative effect of applying the standard and will not result in a recast of our prior year consolidated financial statements. We currently expect that the adoption of ASC 606 will result in an increase in deferred revenue of approximately $6.0 million and a corresponding increase in accumulated deficit, each recorded as of January 1, 2018. This cumulative-effect adjustment primarily reflects the fact that we will recognize revenue later in the performance period as a result of applying the cost-to-cost method under the new standard, in contrast to recognizing revenue on a straight-line basis over the estimated 58-month performance period under the existing standard.

We are in the process of finalizing our assessment of the impact of the new revenue recognition standard on our consolidated financial statements, and our preliminary assessment is subject to change. Refer to Note 2 to our consolidated financial statements appearing elsewhere in this prospectus for additional information.

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 applicable personnel to identify services that have been performed on our behalf, and estimating the level of service performed and the associated cost incurred for the service when we have not yet been invoiced or otherwise notified of 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 the consolidated financial statements based on facts and circumstances known to us at that time. We periodically confirm the accuracy of the estimates with the service providers and make adjustments if necessary. Examples of estimated accrued research and development expenses include fees paid to:

- vendors in connection with the preclinical development activities;
- CMOs in connection with the production of preclinical and clinical trial materials;
- CROs in connection with preclinical studies and clinical trials; and
- investigative sites in connection with clinical trials.

We base our expenses related to preclinical studies and clinical trials on our estimates of the services received and efforts expended pursuant to quotes and contracts with multiple CMOs and CROs that supply, conduct, and manage preclinical studies and clinical trials 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 service 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 the estimate, we adjust the accrual or 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 result in reporting amounts that are too high or too low in any particular period. To date, there have not been 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 employees and directors based on their fair value on the date of the grant and recognize compensation expense of those awards over the requisite service period, which is generally the vesting period of the respective award. We apply the straight-line method of expense recognition to all awards with only service-based vesting conditions and would apply the graded-vesting method to all awards with performance-based vesting conditions or to awards with both service-based and performance-based vesting conditions.

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 remeasured 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-based award 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 common stock options, the risk-free interest rate for a period that approximates the expected term of our common 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, considering our most recently available third-party valuations of common stock, and 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. These third-party valuations 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 valuations were prepared using either an option pricing method (OPM) or a hybrid method, both of which used market approaches to estimate our enterprise value. 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. Under this method, the common stock has value only if the funds available for distribution to stockholders exceeded the value of the preferred stock liquidation preferences at the time of the liquidity event, such as a strategic sale or a merger. A discount for lack of marketability of the common stock is then applied to arrive at an indication of value for the common stock. The hybrid method is a probability-weighted expected return method (PWERM) where the equity value in one or more scenarios is calculated using an OPM. The PWERM is a scenario-based

methodology that estimates the fair value of common stock based upon an analysis of future values for the company, assuming various outcomes. The common stock value is based on the probability-weighted present value of expected future investment returns considering each of the possible outcomes available as well as the rights of each class of stock. The future value of the common stock under each outcome is discounted back to the valuation date at an appropriate risk-adjusted discount rate and probability weighted to arrive at an indication of value for the common stock. These third-party valuations were performed at various dates, which resulted in valuations of our common stock of $4.39 per share as of June 30, 2016, $9.77 per share as of August 31, 2017, and $10.57 per share as of November 27, 2017. In addition to considering the results of these third-party valuations, 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 and clinical trials for our product candidates;
- our stage of development and commercialization and our business strategy;
- external market conditions affecting the biopharmaceutical industry and trends within the biopharmaceutical 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 preferred stock;
- the likelihood of achieving a liquidity event, such as an initial public offering (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 significantly 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.

Options Granted

The following table summarizes by grant date the number of shares subject to options granted between July 1, 2016 and January 31, 2018, the per share exercise price of the options, the fair value of common stock underlying the options on each grant date, and the per share estimated fair value of the options:

Grant Date	Number of Shares Subject to Options Granted	Per Share Exercise Price of Options	Per Share Fair Value of Common Stock on Grant Date	Per Share Estimated Fair Value of Options
October 27, 2016	136,931	$ 4.39	$ 4.39	$ 2.73
February 15, 2017	12,737	$ 4.39	$ 4.39	$ 2.75
May 18, 2017	130,559	$ 4.39	$ 4.39	$ 2.70
September 6, 2017	95,934	$ 9.77	$ 9.77	$ 5.98
October 27, 2017	487,208	$ 9.77	$ 9.77	$ 5.95
November 27, 2017	51,904	$ 10.57	$ 10.57	$ 6.45

We have granted options to purchase an aggregate of 777,071 shares of our common stock, with an exercise price per share equal to the initial public offering price in this offering, to certain of our employees and non-employee directors in connection with this offering.

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 in the rules and regulations of the SEC.

Recently Issued and Adopted Accounting Pronouncements

A description of recently issued accounting pronouncements that may potentially impact our financial position and results of operations is disclosed in Note 2 to our consolidated financial statements appearing elsewhere in this prospectus.

Quantitative and Qualitative Disclosures about Market Risks

Interest Rate Sensitivity

As of December 31, 2017, we had cash, cash equivalents, and marketable securities of $41.0 million, which consisted of cash, money market funds, U.S. Treasury notes, and U.S. government agency bonds. Interest income is sensitive to changes in the general level of interest rates; however, due to the nature of these investments, an immediate 10% change in interest rates would not have a material effect on the fair market value of our investment portfolio.

As of December 31, 2017, we had no debt outstanding and are therefore not subject to interest rate risk related to debt.

Emerging Growth Company Status

The Jumpstart Our Business Startups Act of 2012 (JOBS Act) permits an “emerging growth company” such as us to take advantage of an extended transition period to comply with new or revised accounting standards applicable to public companies until those standards would otherwise apply to private companies. We have irrevocably elected to “opt out” of this provision and, as a result, we will comply with new or revised accounting standards when they are required to be adopted by public companies that are not emerging growth companies.

BUSINESS

Overview

We are a clinical-stage biopharmaceutical company focused on the development and commercialization of novel immunotherapy products designed to harness the power of a patient's immune system to cure cancer. Our proprietary technology, called antibody-coupled T cell receptor (ACTR), is a universal, engineered cell therapy that is intended to be used in combination with a wide range of tumor-specific antibodies to target different tumor types. Our product candidates are composed of ACTR T cells co-administered with approved and commercially available antibodies or antibodies in preclinical or clinical development. Our vision is to use our ACTR platform to transform cancer treatment and deliver patient cures in many different hematologic and solid tumor cancers, improving upon current cell therapies.

In our ongoing Phase I clinical trial using our lead ACTR construct, ACTR087, to treat adult patients with relapsed or refractory non-Hodgkin lymphoma (r/r NHL), we have demonstrated clinical proof of concept, as evidenced by ACTR T cell expansion and persistence, a favorable tolerability profile at the first dose level, and anti-tumor activity. We recently completed patient enrollment into the dose escalation phase of this trial and are advancing towards testing in an expanded patient cohort using an optimized dose of ACTR087 to support potential registration trials.

Our pipeline also includes two additional product candidates in clinical testing. We have commenced a Phase I clinical trial of ACTR707, a modified ACTR construct, used in combination with rituximab in adult patients with r/r NHL and a Phase I clinical trial of ACTR087 used in combination with the novel antibody SEA-BCMA in adult patients with r/r multiple myeloma. Further, we expect to file an investigational new drug application (IND) in 2018 for ACTR707 used in combination with trastuzumab, an FDA-approved antibody, to treat patients with solid tumor cancers that overexpress the human epidermal growth factor receptor 2 (HER2+ cancers). In the longer term, we aim to leverage our ACTR platform to develop a broad range of product candidates to address many different hematologic and solid tumor cancers.

Immuno-oncology, the use of a patient's immune system to treat cancer, is one of the most actively pursued areas of research in drug discovery and development. Adoptive cell therapies are one immuno-oncology approach for cancer treatment. Adoptive cell therapy starts with the isolation of immune cells from a patient, followed by genetic modification of these cells outside the patient's body. Modified cells are then re-introduced into the patient to treat disease. Chimeric antigen receptor (CAR)-T cells are one type of adoptive cell therapy. While CAR-T's efficacy in hematologic cancers has been impressive, limited clinical data have been reported on the use of CAR-Ts in solid tumor cancers and the results have been much less encouraging than in the hematologic cancer setting. Severe side effects, such as cytokine release syndrome (CRS) and neurotoxicity, have been observed in some patients. For certain CARs, on-target, off-tumor effects have led to patient deaths. These toxicities and specific solid tumor challenges create a need to better control the activity of these therapies.

Our product candidates use patient-derived T cells, which are genetically modified to express the ACTR protein and co-administered with a tumor-specific antibody. ACTR is a chimeric protein which combines components from proteins normally found on both T cells and natural killer cells, two types of human immune cells. The natural killer cell component enables binding to tumor cell-bound antibodies and the T cell component enables potent cytotoxicity, proliferation, and persistence. Tumor-targeting antibodies administered with ACTR T cells bind to the surface of the tumor cell and, in effect, label it for ACTR T cell attack. When an ACTR T cell encounters a tumor cell bound with antibodies, it binds to those antibodies and kills the tumor cell through a process known as antibody-dependent cellular cytotoxicity (ADCC), a function not normally observed with T cells. No special modification of the tumor-specific antibody is required in order for ADCC to take place.

ACTR T cells can be directed to a wide range of different cancer cell antigens through the co-administration of antigen-specific antibodies. Thus, we believe an ACTR T cell can be used in many different cancer types.

Preclinical data from in vivo testing show that ACTR T cell-mediated tumor killing activity may be adjusted by modulating the dose of the targeting antibodies. This ability to adjust ACTR T cell activity could make it possible to define an optimal dose through clinical testing to maximize tumor-killing activity and minimize toxicity. In contrast, other cell therapy approaches, such as CAR-Ts and T cell receptors (TCRs), are built to target a specific cancer cell surface antigen and are therefore limited to treating only the particular tumor expressing that antigen. Further, conventionally their activity cannot be readily tuned up or down and, as a result, current CAR-T therapies lack the ability to control cell killing.

We have a broad product pipeline that includes three clinical stage product candidates:

- Our most advanced product candidate, ACTR087 used in combination with rituximab, is being tested in adult patients with r/r NHL in an ongoing Phase I clinical trial called ATTCK-20-2. Two dose levels were explored in the dose escalation phase of this trial. Expansion and persistence of ACTR T cells was observed in all patients evaluable for response in both tested dose levels for as long as monitoring continued, consistent with what has been observed in CAR-T trials. At the first dose level of this trial, patients were targeted to receive a dose of up to 0.5 x 10^6 ACTR T cells/kg (Dose Level One). No adverse events commonly associated with T cell activation (e.g., CRS or neurotoxicity) of any grade were observed. Of the seven patients treated at Dose Level One with ACTR087 used in combination with rituximab, objective responses were observed in the six patients evaluable for response, including two complete responses and one partial response (with duration of responses of 422+[ongoing], 85, and 43 days, respectively). One patient was not evaluable for response due to early progression of disease. While no conclusions regarding the efficacy of ACTR087 can yet be drawn and no head-to-head trials have been conducted that would enable us to make a direct safety and efficacy comparison, the responses observed at Dose Level One are in line with those reported for Yescarta (axicabtagene ciloleucel) and tisagenlecleucel (39% and 32% complete response rates at three months for Yescarta and tisagenlecleucel, respectively, as presented at the 2017 American Society of Hematology Annual Meeting & Exposition). Yescarta was tested in a single arm, open-label, multi-center Phase I/II clinical trial in relapsed, refractory adult patients with diffuse large B cell lymphoma (DLBCL), primary mediastinal large B cell lymphoma (PMBCL), or transformed follicular lymphoma (TFL). Tisagenlecleucel was tested in a single arm, multi-center Phase II clinical trial in relapsed, refractory adult patients with DLBCL.

  At the second dose level of this trial, patients were targeted to receive a dose of up to 1.5 x 10^6 ACTR T cells/kg (Dose Level Two). Nine patients were treated at Dose Level Two (a tenth patient was treated at Dose Level One due to patient cell product limitations). Six of these patients were evaluable for response at the 42-day follow-up as of March 7, 2018. Of the remaining three patients treated at this dose level, two were not evaluable for response due to toxicities and the third patient's NHL progressed prior to the response assessment date. Of the six patients evaluated for response, three patients demonstrated partial responses (8, 43, 121+[ongoing] days). In Dose Level Two, two patients experienced ACTR087-related severe CRS and one patient experienced ACTR087-related neurotoxicity, which was fatal. Of the two events of CRS, one patient subsequently experienced a fatal case of enterococcal sepsis considered related to ACTR087 and one patient subsequently experienced a fatal case of sepsis considered not related to ACTR087. After review of the observed safety events, we concluded that Dose Level Two exceeds the maximum tolerated dose under the standard rituximab dosing regimen and do not intend to further escalate the cell dose in this regimen. The severe CRS and fatal neurotoxicity adverse events observed in Dose Level Two have been associated with T cell activation and are frequently observed in patients receiving CAR-T cell treatment. For example, NHL adult patients treated with Yescarta experienced severe CRS and neurotoxicity (13% and 31%, respectively, per U.S. prescribing information).

  Based on the results to date, we intend to expand the dataset, building upon the results observed in the clinical trial to date. In our expansion cohort, we will administer a flat dose (i.e., not adjusted by patient weight) of 60 x 10^6 ACTR T cells, which is approximately midway between Dose Level One and Dose

Level Two assuming an 80 kilogram patient, and we will continue to treat patients with the standard rituximab schedule (375 mg/m^2 every three weeks). We expect to report preliminary data from this cohort expansion of ATTCK-20-2 at the end of 2018 and complete enrollment by the end of 2019. In parallel with this ongoing Phase I clinical trial, we plan to initiate a Phase II clinical trial exploring ACTR087 used in combination with rituximab in adult patients with r/r NHL who received prior CD19 CAR-T therapy.

- Our second clinical stage product candidate, ACTR707 used in combination with rituximab, is being tested in adult patients with r/r NHL in a Phase I, multi-center, open-label clinical trial called ATTCK-20-03. ACTR707 is a modified ACTR construct designed to generate a more potent and sustained immune response to overcome immunosuppressive tumor microenvironments commonly found in solid tumor cancers. ACTR707 demonstrated activity against both hematologic and solid tumor cancers in preclinical studies. For initial testing, we are leveraging our clinical experience with ACTR087 in r/r NHL by exploring ACTR707 used in combination with rituximab in the same patient population. We believe this will enable rapid execution of the study and facilitate a meaningful comparison between ACTR087 and ACTR707. We are currently enrolling and dosing patients, and we expect to report initial data from the clinical trial in the fourth quarter of 2018. We plan to continue enrolling patients in this trial into 2019. We expect to leverage data from the Phase I clinical trial in future studies by combining ACTR707 with a variety of antibodies targeting different cancers.
- Our third clinical stage product candidate, ACTR087 used in combination with SEA-BCMA, is the first product candidate resulting from our strategic collaboration with Seattle Genetics, Inc. (Seattle Genetics). The SEA-BCMA antibody is designed to target BCMA, an antigen with high and selective expression on the surface of malignant plasma cells in multiple myeloma. We are currently enrolling and dosing adult patients with r/r multiple myeloma in a Phase I multi-center trial and expect to report initial data from this trial in the fourth quarter of 2018.
- ACTR707 used in combination with trastuzumab is currently in late preclinical development as a potential treatment for HER2+ solid tumor cancers. Antigen-specific killing of HER2-overexpressing tumor cells has been demonstrated with this combination in preclinical studies. In addition, ACTR707 used in combination with trastuzumab has shown high selectivity, discriminating killing activity between HER2-expressing tumor cells and non-tumor cells with low levels of HER2 expression in preclinical studies. This is especially important, because certain normal tissues, including heart and lung tissues, are known to also express HER2 but at lower levels. CAR-T cells are often unable to distinguish high, on-tumor expression from low, off-tumor expression of antigens, and kill cells with any level of antigen indiscriminately. HER2 CAR-T cells previously tested in the clinic have demonstrated potent on-target, off-tumor activity, which is believed to have resulted in toxicity and death when administered to a patient. We plan to file an IND and initiate clinical testing of ACTR707 used in combination with trastuzumab in 2018.
- In the longer term, we plan to leverage the investment we have already made in ACTR and the clinical validation and de-risking of ACTR that we aim to achieve through the current clinical trials, to rapidly expand our pipeline of ACTR-based product candidates to address a range of hematologic and solid tumor cancers.

Our Pipeline

The following table summarizes our product candidate pipeline:

Product Candidate	Indication	Clinical Phase	Last Event	Next Expected Event
ACTR087+rituximab	r/r B cell non-Hodgkin lymphoma	Phase I	Completion of dose escalation	Initiation of cohort expansion
	r/r B cell non-Hodgkin lymphoma, patients who received prior CD19 CAR-T therapy			Initiation of Phase II trial
ACTR707+rituximab	r/r B cell non-Hodgkin lymphoma	Phase I	Initiated Phase I dose escalation	Interim safety and efficacy data
ACTR087+SEA-BCMA *(collaboration with Seattle Genetics)*	r/r multiple myeloma	Phase I	Initiated Phase I dose escalation	Interim safety and efficacy data
ACTR707+trastuzumab	HER2+ cancers	Preclinical	Initiated non-clinical studies to support IND filing	IND filing

We aim to continue to improve the functionality of the ACTR T cell in solid tumor cancers through (i) additional genetic modifications to exploit new supporting biology in the tumor microenvironment and (ii) introducing new manufacturing process modifications.

We have obtained and retained worldwide commercial rights to the majority of our product candidates, including our lead product candidate, ACTR087 used in combination with rituximab. We intend to establish our own commercial organization in the United States where we believe we can address physicians with a direct specialty sales force. Our commercial strategy for markets outside the United States may include the use of strategic partners or the establishment of our own commercial infrastructure. We plan to further evaluate these alternatives as we approach potential approval of our product candidates.

In June 2015, we announced a global strategic collaboration with Seattle Genetics to identify, research, develop, and commercialize two novel antibody-coupled ACTR therapies incorporating Seattle Genetics' proprietary antibodies. Under the terms of the collaboration, we will conduct preclinical research and clinical development activities through Phase I clinical trials and Seattle Genetics will provide all of the funding for those activities. We plan to work together to co-develop and fund product candidates after Phase I clinical trials unless either company opts-out from further development and commercial activities. Seattle Genetics has the option to opt-out from further development and commercialization activities for each of the two product candidates under the collaboration during two specified periods subsequent to Phase I clinical development. We have an option to opt-out from further development and commercialization activities for each of the two product candidates under the collaboration during a specified period subsequent to Phase II clinical development. If neither party elects to opt-out of further development and commercialization activities, we will co-commercialize any successfully developed product candidates and share equally any profits and losses on any co-developed product candidates in the United States. Seattle Genetics retains exclusive commercial rights outside of the United States. The first product candidate under our collaboration is ACTR087 used in combination with Seattle Genetics' SEA-BCMA antibody for r/r multiple myeloma.

Clinical development and commercialization of ACTR products are supported by our efforts to optimize manufacturing from the initial collection of a patient's white blood cells through the re-infusion of a formulated ACTR T cell product (i.e., from "vein-to-vein"). To this end, we have developed a largely automated ACTR manufacturing process with quality, scalability, cost, and consistency in mind. We plan to continuously enhance this process using a toolkit of individually optimized process components in order to be able to rapidly customize manufacturing to our specific needs, relying as much as possible upon non-proprietary equipment and processes. We are currently addressing clinical manufacturing needs for both viral vector and ACTR T cells with contract manufacturing organizations (CMOs) to increase flexibility and mitigate risks. In the future, we plan to establish our own good manufacturing practices (GMP) manufacturing facility to increase our control of product quality, scheduling, and

process knowledge. As our product candidates advance through clinical trials, we expect to secure commercial manufacturing capacity using one or more CMOs or by establishing our own commercial manufacturing GMP facility.

Intellectual property is an important component of our assets. We are working to establish strong patent protection and trade secrets to position us as a leader in the practice of ACTR technology. We are developing proprietary technology and are licensing patent rights from third parties. In doing so, we have focused on ensuring our ability to operate freely within the complex patent landscape of cell therapy. We have filed a series of patent applications that aim to cover the ACTR platform, as well as specific product candidates.

We believe that the quality of our people has a strong and positive impact on our ability to develop and capitalize on our ACTR platform. We have assembled a team of highly skilled and experienced employees, directors, scientific advisors, and consultants with broad capabilities in oncology drug discovery and development. In addition, our scientific founder and an inventor of our key patents relating to ACTR087, Dario Campana, M.D., Ph.D., is considered a world leader in cancer cell therapy. Dr. Campana continues to support our efforts as Chair of our Scientific Advisory Board.

Since our inception in March 2014, we have raised $77.3 million from sales of our preferred stock to our venture capital investors, major mutual funds, healthcare-dedicated funds, and others. In addition, through December 31, 2017, we had received $25.0 million in an upfront payment and $7.5 million in research and development funding from Seattle Genetics as part of the strategic collaboration. Collectively, these stakeholders share our commitment to bringing our product candidates to market and our vision of revolutionizing medicine through developing a broadly applicable cell-based platform.

Our Strategy

Our goal is to transform cancer treatment through the application of our universal ACTR platform in a wide range of hematologic and solid tumor cancers. Key elements of our strategy include the following objectives:

- ***Expedite clinical development, regulatory approval, and commercialization of our product candidate ACTR087 used in combination with rituximab.*** We plan to continue to advance our lead product candidate, ACTR087 used in combination with rituximab, for the treatment of adult patients with r/r NHL. If we believe the Phase I data are compelling, we plan to discuss with the FDA the potential to move to a registration trial in adult patients with r/r NHL upon completion of the current Phase I clinical trial. Additionally, we plan to submit regulatory filings to enable a Phase II clinical trial in 2018 to evaluate ACTR087 used in combination with rituximab in adult patients with r/r NHL who received prior CD19 CAR-T therapy.
- ***Leverage our universal ACTR platform to broaden our product portfolio rapidly and cost effectively.*** ACTR is an investigational engineered cell therapy that we believe can be used in combination with a wide range of tumor-targeting antibodies to pursue different antigens and cancer indications. Our product candidates are composed of ACTR T cells co-administered with approved and commercially available antibodies or antibodies in preclinical or clinical development. ACTR does not need to be modified for use with different antibodies, and antibodies do not need to be modified for use with ACTR. This allows us to leverage our investment in ACTR and the investment by third parties in existing antibodies across different ACTR–antibody combinations, tumor types, and indications. We expect the universality of our ACTR platform will allow us to prosecute four product candidates by the end of 2018.
- ***Expand our pipeline with increased focus on solid tumor product candidates***. We will leverage the potential of the ACTR platform by combining ACTR with a wide range of de-risked commercial-stage and development-stage tumor-targeting antibodies to treat hematologic and solid tumor cancers with significant unmet medical needs. With a particular aim at creating an ACTR that addresses the specific challenges associated with attacking solid tumor cancers, we have developed a modified ACTR

construct called ACTR707. We believe that the changes in ACTR707 will allow ACTR T cells to behave more favorably in immunosuppressive tumor microenvironments commonly found in solid tumor cancers. We plan to use ACTR707 to rapidly progress ACTR product candidates targeting solid tumor cancers into clinical development, starting with ACTR707 used in combination with trastuzumab for HER2+ cancers. We aim to continue to improve the functionality of the ACTR T cell in solid tumor cancers through (i) additional genetic modifications to exploit new supporting biology in the tumor microenvironment and (ii) introducing new manufacturing process modifications.

- ***Establish manufacturing capacity and leverage our process development capabilities to create a competitive advantage in T cell manufacturing.*** We designed a process using a closed automated system to support our clinical development plans and have devoted significant resources to optimizing process development. We currently engage CMOs to use our process for production of GMP material. In the future, we intend to establish our own GMP manufacturing facility.
- ***Establish commercialization and marketing capabilities to support current and future product candidates.*** We plan to establish a U.S.-focused specialty sales and marketing organization in advance of receipt of regulatory approval of the first ACTR product candidate. We intend to leverage the infrastructure developed for our first approved ACTR product to facilitate commercialization of any additional product candidates for which we gain approval. In addition, we will build upon physician familiarity and experience with the first approved ACTR product to accelerate adoption of subsequent products. Our commercial strategy for markets outside the United States may include the use of strategic partners or the establishment of our own commercial infrastructure.

Background

Immune System and T cells

Our immune system has evolved to respond to injury and attacks to the body. It provides continuous surveillance and defense against attacks both by foreign pathogens and by mutated cells that lead to cancer. Cells and proteins produced by the immune system are found in all the tissues of the body and in the blood.

The immune system triggers two different types of response. The *innate response* is an unspecific, unspecialized response, composed of immune components capable of reacting against a broad range of stimuli. Innate immune components, including proteins (e.g., complement factors) and cells (e.g., natural killer cells, macrophages), are ever present, always ready for immediate activation. In contrast, the *adaptive response* allows for a slower but tailored response to specific insult. It evolves following an initial assault and strengthens with each subsequent infection or mutational event, thereby allowing for long-term protection. As a result of this increased specificity, adaptive responses can be more potent: they selectively target the pathogen or mutated cell while sparing normal, healthy tissues.

Adaptive responses include a humoral component, comprised of antibodies, and a cellular component, comprised of T cells. Antibodies are secreted proteins capable of binding to specific toxins or foreign substances generated during infection or mutation, referred to as antigens. Once bound to an antigen, an antibody can work *directly* to block the biological function of the antigen or *indirectly* by recruiting components of the innate immune system like natural killer cells to drive attack. T cells recognize infected or mutated cells when their TCR recognizes and binds to a foreign or mutated peptide presented through a set of proteins on the surface of the targeted cell called the major histocompatibility complex (MHC). The binding of a TCR to an infected or mutated cell, such as a tumor cell, can trigger T cell activation, resulting in direct killing of the cell through release of toxins, as well as the stimulation of cytokines and other molecules that recruit and activate additional immune cells.

Immunotherapies in Oncology

Historically, cancer treatment has relied upon a combination of surgery, radiation, and chemotherapy. More recently, targeted therapies that modulate specific signaling pathways in cancer cells have been the focus of

many drug discovery efforts. Unfortunately, targeted pathways are often also functional in normal cells, leading to significant toxicities. More selective small molecules are better tolerated by patients and can have dramatic initial effects. In many cases, however, these benefits are short lived as persisting cancer cells acquire drug resistance. Most metastatic cancers remain incurable despite the enormous investment in novel therapies.

Immunotherapy seeks to harness a patient's immune system to fight cancer. The high specificity of the adaptive immune system translates into a reduced risk of toxicity by distinguishing between normal tissue cells and cancer cells. The ability to adaptively respond enables the immune system to overcome some of the mechanisms by which cancer cells acquire drug resistance, translating into more durable responses. There are several current approaches that use the immune system to treat cancer.

Immune checkpoint inhibitors are therapeutic antibodies that activate a patient's own T cells by blocking inhibitory signals released by the tumor to suppress the immune system's natural T cell activity. Antibodies targeting the antigens CTLA4, PD-1, and PD-L1 have yielded significant responses in patients with a range of indications including melanoma, non-small cell lung cancer, and renal cancer.

Additionally, monoclonal antibodies can be used to exert cancer cell cytotoxicity through specialized mechanisms, including ADCC, which is the primary mechanism of action of many cancer therapeutic antibodies. ADCC occurs when the tail region of an antibody, referred to as the Fc domain, binds to Fc receptors on the surface of certain immune cells, especially natural killer cells. A naturally occurring variant of CD16, one type of Fc receptor expressed on natural killer cells and macrophages, has been shown to bind more tightly to the Fc domain and patients expressing this variant demonstrate better responses to ADCC-inducing therapeutic antibodies. These results have inspired efforts to enhance ADCC activity in engineered monoclonal antibodies to improve efficacy across a broader patient population.

Finally, therapies have been developed based upon adoptive cell transfer, the process of isolating immune cells, modifying them outside the patient's body, and then introducing them into a patient to treat disease. The current wave of adoptive cell therapy efforts is largely focused on the use of T cells engineered to express either TCRs or CARs. In order to be effective as a therapy, an engineered T cell must (i) selectively target tumor cells, (ii) activate cytotoxic tumor cell killing, and (iii) simultaneously activate pathways to ensure the T cell's proliferation and survival. The matrix below shows the mechanisms of action for many current TCRs and CARs, and for ACTR:

Activity	Tumor Targeting	Cytotoxic Killing Trigger	Proliferation and Survival
TCR	TCR-alpha/beta on T cell bind peptide+MHC on tumor	CD3zeta	None
CAR	scFv (antibody fragment) of CAR-T cell binds tumor antigen	CD3zeta	Costimulatory domain (for example, 4-1BB or CD28)
ACTR	CD16 domain of ACTR T cell binds to co-administered antibody, antibody binds tumor antigen	CD3zeta	Costimulatory domain (for example, 4-1BB or CD28)

T cell Receptors (TCRs) are naturally occurring protein complexes expressed on the surface of T cells. They are the primary mechanism by which T cells normally distinguish "foreign" cells from "self" and trigger immune attack. In most T cells, a TCR contains a pair of proteins, TCR-alpha and TCR-beta, which directly recognize processed peptides of the MHC presented on the surface of cells and exert cytotoxicity when engaged.

In some cases, these TCRs can be used “as is” with no further modifications. In other cases, activity can be improved by engineering the TCR to recognize the tumor peptide with higher affinity. TCR-based cellular therapies have shown promising clinical activity in treating certain cancers.

Several challenges have been encountered with TCR-based approaches. Some tumor cells acquire mutations that change the MHC molecule or reduce the level of MHC expressed on their surface. This prevents or limits recognition by TCRs and thus makes tumor cells resistant to T cell attack. In addition, engineering TCRs to improve their affinity can also change their specificity and cause them to direct T cell attack towards normal tissues. This change in specificity has in some cases led directly to patient deaths. Lastly, there are many naturally occurring variants of MHC in the human population. A TCR recognizes only certain MHC variants, meaning that a given TCR construct can only potentially work with a fraction of patients.

Chimeric Antigen Receptors (CARs) are synthetic proteins, assembled by linking together individual protein domains from different genes (in this context, a *chimera* is a molecule with sequences derived from two or more different starting molecules). All CARs contain an extracellular recognition domain responsible for recognizing and binding an antigen specifically presented on a target cell (hence the name, “chimeric *antigen* receptor”). Most often, this recognition domain is a small single chain variable fragment (scFv) isolated from a larger, full-length antibody. The scFv is tethered to the surface of the T cell by a “hinge” or “spacer” domain. This domain provides positional flexibility, allowing the scFv to orient properly to engage the antigen. Passing through the plasma membrane of the cell, a transmembrane domain effectively connects the extracellular domains involved in target cell recognition to the intracellular domains that cause the T cell to respond.

In the earliest CAR examples (known as first generation CARs), a single intracellular signaling domain was used, isolated from the CD3-zeta chain of the T cell receptor complex. CARs built with this domain were shown to be capable of driving the killing of target cells in laboratory experiments but results in patients were generally unimpressive. With few exceptions, first generation CAR-T cells failed to persist in patients long enough to exert significant anti-tumor activity and provide therapeutic benefit.

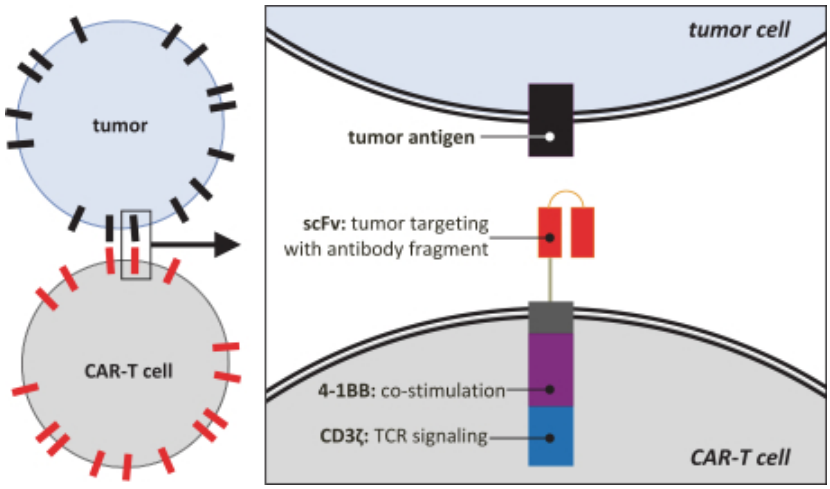
Second generation CARs include additional signaling domains from certain proteins (known as co-stimulatory molecules) in order to improve activation of the CAR-T cells. These signaling domains turn on additional pathways in the T cell that promote cytokine secretion, survival, and proliferation, all of which strengthen the anti-tumor response. Second generation CARs have yielded more positive results in clinical testing. Promising results have been observed in therapy-resistant patient populations with ALL and B cell NHL, leading to recent approvals in both indications.

Notwithstanding the observed effectiveness and favorable response rates, severe side effects have also been observed with these therapies, in some cases leading to patient deaths. Toxicities include CRS, neurotoxicity, and on-target, off-tumor effects. These have spurred the desire to develop better-controlled therapies. Additionally, the vast majority of programs with demonstrated responses have been limited to hematologic cancers, such as ALL, NHL, and multiple myeloma. The cellular environment in which solid tumor cancers exist (known as the tumor microenvironment) is inimical to T cells due to several factors including: (1) immunosuppressive cells (e.g., regulatory T cells (Tregs), myeloid derived suppressor cells (MDSCs)), (2) immunosuppressive enzymes and signaling molecules (e.g., IDO1, TGF-beta), (3) limited nutrients (e.g., oxygen, glucose), and (4) toxic metabolites (e.g., reactive oxygen species, lactic acid). Together, these factors can limit the ability of CAR-T cells both to penetrate into the solid tumor and to function properly once there. While the number of clinical trials focused on solid tumor cancers is growing, limited clinical data have been reported and results to date have been less encouraging.

CARs target tumor cells using an scFv prepared from a tumor-specific antibody. Given that tumors express indication-specific tumor antigens, creating a CAR-T therapy for a new cancer indication typically requires the construction of a new CAR made from a newly engineered scFv. scFvs typically show reduced affinity and a higher likelihood of misfolding than antibodies. scFv misfolding drives receptor aggregation which triggers

signaling and activation of the CAR-T cell in the absence of a tumor cell. This signaling in the absence of a tumor antigen, known as tonic signaling, promotes premature T cell differentiation and exhaustion, reducing CAR-T anti-tumor activity.

The graphic below illustrates the structure of a CAR, including the engineered scFv, and the interaction between the scFv and the applicable antigen on the tumor cell:



Our Solution

Antibody-Coupled T cell Receptor (ACTR) is a different kind of chimeric receptor, initially invented in the laboratories of our scientific founder, Dr. Dario Campana, at St. Jude's Children's Research Hospital and the National University of Singapore, and later expanded and improved by our scientists. ACTR is a single construct that we believe can be used in combination with a wide variety of separately administered tumor-targeting antibodies to pursue different antigens and tumor types. Antibodies have been developed to target many different cancers. Our approach leverages existing antibodies to mobilize a cytotoxic cellular response to attack antibody-labeled cancer cells.

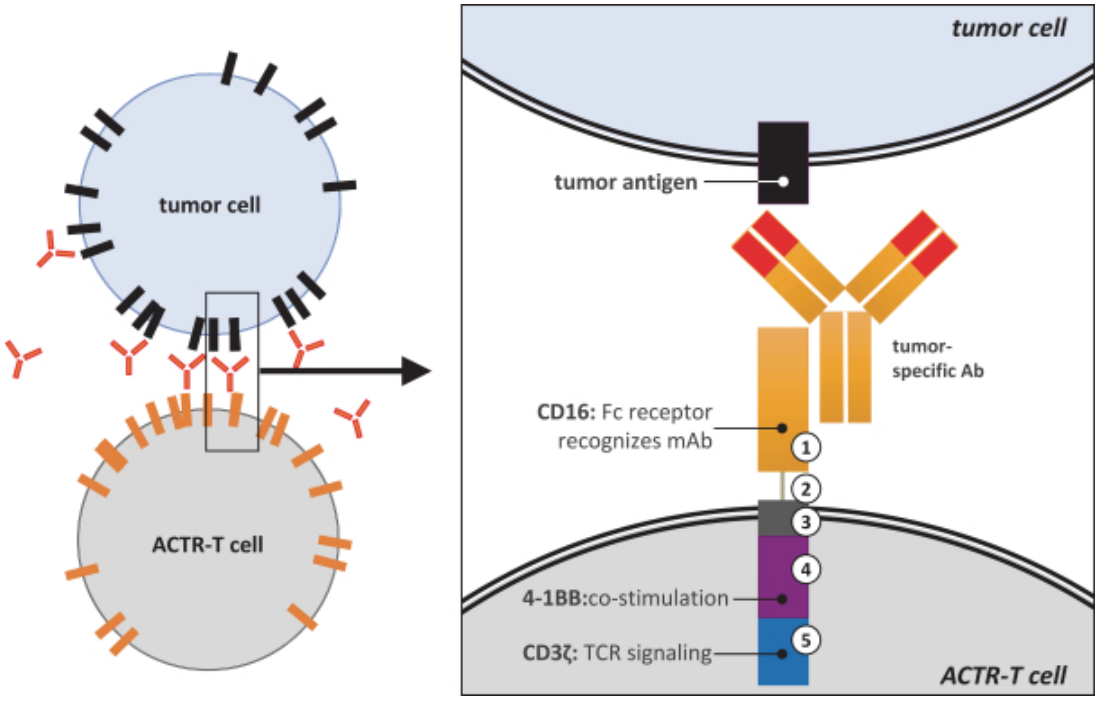
ACTR's design differs from CAR in its extracellular domain. In lieu of the scFv found in a CAR, the extracellular domain of ACTR consists of the Fc-binding domain of CD16. As previously noted, CD16 is normally expressed on natural killer cells and macrophages, where it recognizes the Fc domain of cell-bound antibodies. Without an scFv attached to its surface, the ACTR T cell is unable to recognize tumor cells directly. However, when a tumor-targeting antibody is provided, the ACTR T cell is able to recognize tumor cells through antibodies bound to the surface of the tumor cells. Once it is bound to an antibody on the tumor cell, an ACTR T cell exerts ADCC, a function not normally observed with T cells, to kill the tumor cell. No special engineering of either the therapeutic antibody or of the ACTR receptor is required in order for a functional interaction to take place.

Once an ACTR T cell engages a tumor cell bound with the therapeutic antibody, it works in several different ways to drive an anti-tumor response:

- The ACTR T cell injects protein toxins (known as granzymes and perforins) which quickly kill the tumor cell.
- After attacking and killing one tumor cell, it serially disengages and moves on to attack others.
- It secretes cytokines that recruit other immune cells such as natural killer cells and macrophages with a broader range of activities.

- It undergoes cell division to produce daughter cells with the same Fc extracellular domain to perpetuate the response.

The graphic below illustrates the structure of an ACTR T cell, showing how the Fc receptor recognizes and binds to the tumor-bound antibody.



The five domains of the ACTR T cell, shown in the above graphic, function to facilitate the T cell attack of the tumor cell in the following ways:

1. An *extracellular* domain (e.g., CD16) serves as an Fc receptor, binding to a tumor-bound therapeutic antibody through its constant Fc domain.
2. A *hinge* domain (e.g., CD8) provides flexibility to allow the extracellular domain to effectively orient and engage antibody bound to a target cell.
3. A *transmembrane* domain (e.g., CD8) anchors ACTR within the proper location in the cell and functionally couples antigen engagement by the extracellular domain with signaling activities in the intracellular domain.
4. A *co-stimulatory* domain (e.g., 4-1BB or CD28) provides added cytokine and survival signals essential for prolonged anti-tumor activity.
5. A TCR *signaling* domain (e.g., CD3zeta) initiates a signaling cascade to trigger cytotoxic attack.

Preclinical studies have demonstrated robust anti-tumor activity of ACTR-expressing T cells when combined with several different tumor-specific antibodies, including rituximab (an anti-CD20 antibody marketed as Rituxan), trastuzumab (an anti-HER2 antibody marked as Herceptin), and hu14.18K322A (an anti-GD2 antibody).

Our initial efforts were directed at testing our original ACTR construct, ACTR087, with different antibodies to identify combinations for clinical testing in new indications. In addition, we systematically explored modifications to the ACTR design. With a particular aim at creating an ACTR optimized for solid tumor cancers, we evaluated 100+ constructs through a series of high throughput screening assays. From these efforts, we identified a modified ACTR construct called ACTR707 which is now in clinical testing. Based on preclinical data, we expect ACTR707 may function particularly well in solid tumor cancers, given its propensity to proliferate, secrete cytokines and persist following a repeated exposure to target tumor cells. We aim to continue to improve the functionality of the ACTR T cell in solid tumor cancers through (i) additional genetic modifications to exploit new supporting biology in the tumor microenvironment and (ii) introducing new manufacturing process modifications.

Key Differentiating Characteristics of ACTR

We believe ACTR offers distinct advantages over alternative immunotherapies:

- **A Universal Approach.** ACTR is a single construct that we believe can be used in combination with a wide variety of tumor-targeting antibodies to pursue different antigens and cancer indications. ACTR leverages CD16, a receptor normally found on natural killer cells, to recognize a wide range of tumor cell-bound antibodies and drive cytotoxic attack. Unlike CAR-T, in which a new synthetic receptor has to be created, manufactured, and tested for each new antigen, ACTR relies upon the same CD16 binding irrespective of tumor antigen or co-administered antibody. As a result, our ACTR construct needs to be engineered, manufactured, and preclinically validated only once, and the clinical de-risking of ACTR can be leveraged across many ACTR-antibody combinations. This enables us to rapidly and efficiently expand our product candidate pipeline.
- **Therapy with Potential for Superior Activity.** Preclinical testing of ACTR in combination with a wide range of tumor-targeting antibodies has demonstrated tumor killing potential. Initial data from our ongoing Phase I clinical trial evaluating ACTR087 used in combination with rituximab in adult patients with r/r NHL suggest that ACTR can achieve tumor reduction. Several factors may contribute to potency:
    - ACTR shows minimal signaling in the absence of tumor antigen (i.e., tonic signaling) in preclinical testing. CAR-T tonic signaling drives accelerated T cell differentiation and ultimately exhaustion, compromising anti-tumor activity.
    - ACTR is composed of fragments of naturally occurring human proteins and, as such, has a reduced likelihood of generating an immune response directed at the ACTR T cell, potentially translating into better persistence. CAR-T, especially those with mouse-derived scFvs, are synthetic constructs that can and have triggered immune responses which can cause rapid clearance of CAR-T cells from patients.
    - The use of a complete, co-administered antibody with ACTR, instead of an antibody fragment in the scFv format used in CAR-T, typically maintains better functional activity, including improved folding, affinity for the antigen, and improved strength of the antibody–antigen target complex through bivalency.
    - Therapeutic activity of the co-administered antibody used to direct the ACTR T cell can supplement the ACTR T cell-mediated cytotoxicity (e.g., signal blockade, Fc effector functions). Antibodies are not part of the treatment for CAR-T therapy.
    - The CD16 domain of ACTR has evolved to efficiently engage a wide range of tumor cell-bound antibodies to drive cytotoxic attack. The scFv domains of CARs are synthetic constructs and must be empirically engineered to optimize function.
- **Increased Control and Tunability.** In preclinical experiments, ACTR activity scales with the amount of the co-administered antibody. As such, we believe ACTR activity can be tuned up or down by

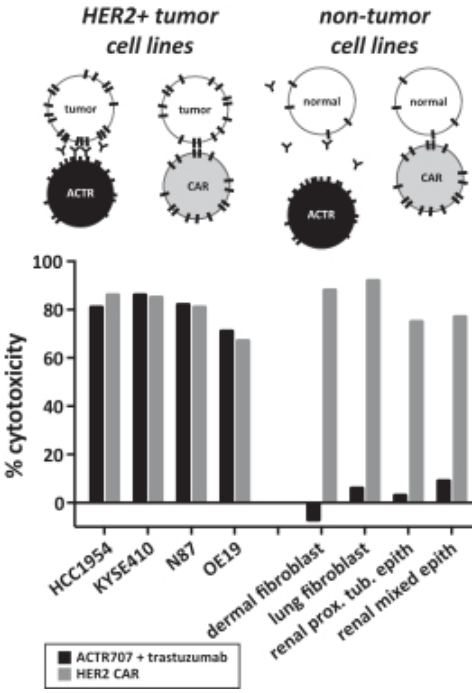
modulating antibody dosing. This ability to adjust ACTR T cell activity could make it possible to define an optimal dose through clinical testing to maximize tumor-killing activity and minimize toxicity.

- We believe that optimized dosing of our ACTR product could reduce class toxicities associated with T cell therapies, including CRS and neurotoxicity. These toxicities may be a function of both the overall level and the speed of tumor cell killing by T cells. Once CAR-T cells have been administered to a patient, they are effectively armed to attack all cells expressing the CAR-specific antigen and proliferate indefinitely. This means that there is currently no straightforward way to control the intensity of the immune response they trigger. In contrast, preclinical studies suggest that by dosing less antibody, ACTR T cell activity may be capped and slowed. Once appropriate dosing is determined through clinical testing, it may be possible to avoid the life-threatening toxicities seen with CAR-Ts.
- The ability to gradually turn off ACTR T cell activity by withdrawing antibody may provide a simple means for minimizing toxicity that is not feasible with CAR-T therapies. This may have effects on long term toxicity as well. For example, several lineage antigens targeted by CAR-T for hematologic indications (e.g., CD19, CD33, CD123) are expressed on normal tissues that serve important functions. Eliminating these normal tissues through an on-target, off-tumor effect may be tolerated in the short-term but they may create long-term toxicity risk to patients. For instance, CD19 CAR-mediated B cell aplasia may increase infection risk. CARs specific for CD123 have the potential to target hematopoietic progenitor cells and risk bone marrow failure.

- **Breadth of Targeting Allows Many Accessible Antibody Combinations.** We believe that the ACTR mechanism of action allows for a number of antigen/indication opportunities that may be difficult or impossible to pursue with alternative T cell therapies.
  - Antibodies have been generated, manufactured as GMP material, and clinically tested against dozens of tumor antigens. Some have demonstrated therapeutic benefit and we believe ACTR may enhance this benefit. Many others have demonstrated tumor specificity but have failed to provide therapeutic benefit, most likely because of the inability to translate tumor cell binding into tumor cell killing, referred to as effector function. We believe many of these non-efficacious antibodies may demonstrate therapeutic benefit when armed with ACTR T cells. Because these antibodies do not need to be modified for use with ACTR, we can leverage all prior investment in their development, including by using the same GMP supply of antibody and leveraging available safety data.
  - Several therapeutically relevant antigens (e.g., CD38, CD7) are expressed on activated T cells, making it challenging or impossible to manufacture T cells that are targeted to these antigens. CARs specific for such antigens undergo cell suicide and fratricide. In contrast, ACTR T cells are made in the absence of targeting antibodies, meaning that they can be manufactured for these antigens without these complications. Once combined with targeting antibodies after manufacturing, ACTR T cells have shown cancer cell killing without apparent suicide or fratricide.
  - Preclinical studies indicate that ACTR T cells can be targeted to multiple antigens using a combination of multiple tumor-specific antibodies. Such combinations may be useful to limit or reduce the development of tumor resistance to therapy, and increase the sensitivity by simultaneously targeting two different parts of a single target antigen.

- **ACTR's Potential for Solid Tumor Cancers.**
  - Many solid tumor antigens (e.g., HER2) are expressed at low levels on certain normal tissues. The ability to discriminate between tumor and normal tissues is critical to ensure the safety of a targeted T cell therapy.
    - CARs have limited ability to distinguish between cancer cells displaying high amounts of an antigen and certain normal tissues that present low levels of the same antigen. As a result, toxicities, including patient deaths, have occurred when CAR-T cells attack normal tissues.
    - We believe ACTR is able to discriminate its killing activity based on the amount of antigen expressed on a target cell. This is likely a result of the fact that recognition of the tumor cell is based upon many weak interactions between ACTR's extracellular domain and the targeting antibodies bound to the tumor cell, which work cooperatively to drive tight but specific binding. A normal cell with low antigen levels will have few bound antibodies and is not expected to activate the ACTR T cell. As shown in the figure below, in a comparison of ACTR707 used in combination with trastuzumab and a HER2 CAR, ACTR exhibited lower levels of cytotoxicity in non-tumor cell lines.
    - In addition, preclinical studies suggest that ACTR T cell activity can be adjusted by modulating antibody dosing. This ability to adjust ACTR T cell activity could make it possible to define an optimal dose through clinical testing to maximize tumor-killing activity and minimize toxicity. CAR-T cells currently have no similar means of adjusting their relative activity.
  - Tumor cells have evolved to evade immune system attack, and the tumor microenvironment surrounding solid tumor cancers is hostile to T cell function. To be effective in treating solid tumor cancers, it is important that therapeutic T cells sustain activity under adverse conditions.
    - CAR-T cells often exhibit tonic signaling as a result of receptor misfolding and aggregation, leading to chronic low-level activation. CAR-T cells thus tend towards premature differentiation and exhaustion, compromising their anti-tumor activity.
    - ACTR T cells exhibit very little tonic signaling in preclinical studies, due to the well-folded nature of the CD16 extracellular domain. As such, ACTR T cells retain a 'younger' phenotype than CAR-T and are enriched with cell types known to drive potent anti-tumor responses.

We have tested ACTR's on-target, off-tumor effect *in vitro*. The figure below shows the results of an *in vitro* study in which ACTR707 used in combination with trastuzumab and a HER2-targeting CAR were exposed to HER2+ tumor cells and non-tumor cells expressing low levels of HER2, and the relative amounts of cytotoxicity observed with each treatment. While cytotoxicity against tumor cells was comparable for CAR and ACTR, CAR treatment resulted in much higher levels of cytotoxicity against non-tumor cells than ACTR treatment.



Our Product Candidates

We are leveraging our universal ACTR platform to rapidly and efficiently develop ACTR-based therapies for a wide range of hematologic and solid tumor cancer indications. ACTR does not need to be modified for use with different antibodies, and antibodies do not need to be modified for use with ACTR. As a result, we believe we can leverage our investment in ACTR, as well as the investment made by third parties in available antibodies, across different ACTR-antibody combinations, tumor types, and indications.

Our objective is to use the same ACTR construct in a wide range of ACTR-based therapies for both hematologic and solid tumor cancers. We aim to continue to improve the functionality of the ACTR T cell in solid tumor cancers through (i) additional genetic modifications to exploit new supporting biology in the tumor microenvironment, and (ii) introducing new manufacturing process modifications.

We currently have three clinical stage ACTR product candidates. Our most advanced product candidate, ACTR087 used in combination with rituximab, leverages our ACTR platform to target CD20, an antigen expressed on the surface of B cell NHL. Our second clinical stage product candidate, ACTR707 used in combination with rituximab, uses a modified ACTR construct designed to generate a more potent and sustained immune response to overcome immunosuppressive tumor microenvironments commonly found in solid tumor cancers. Our third clinical stage product candidate, ACTR087 used in combination with SEA-BCMA, leverages our ACTR platform to target BCMA, an antigen with high and selective expression on the surface of malignant

plasma cells in multiple myeloma. In 2018, we expect to initiate a Phase I clinical trial for ACTR707 used in combination with trastuzumab for HER2+ solid tumor cancers.

Any anti-tumor activity, or efficacy, we observe in each of these Phase I clinical trials will be reported in our regulatory submissions to the FDA and any other health authorities as required during development, and we will use these data to inform the emerging benefit/risk profile of each combination and to determine whether to move forward into a registration trial. We believe the data from these Phase I clinical trials will be supportive, if positive, but the primary purpose of our Phase I clinical trial is to evaluate safety and we do not expect the data from these trials to be registration-enabling clinical trial data sets sufficient for marketing authorization. We would only expect to receive marketing authorization for a combination if the combination demonstrated safety and efficacy in at least one subsequent registration trial.

ACTR087 Used in Combination with Rituximab for B Cell Non-Hodgkin Lymphoma

Our most advanced product candidate is ACTR087 used in combination with rituximab. ACTR087 uses a 4-1BB co-stimulatory domain. Rituximab is a chimeric monoclonal antibody that is FDA-approved in the United States (and elsewhere) to treat the blood cancers NHL and chronic lymphocytic leukemia that also affect the body's B cells. Rituximab binds to CD20, a molecule found on the surface of all B cells and is not known to be expressed on any other tissue. While targeting CD20 has the potential to deplete B cells, experience has shown that humans can live without B cells for a prolonged period of time and that the level of B cells recovers upon cessation of therapy. We believe CD20 is an attractive immunotherapeutic target for the treatment of B cell malignancies.

B Cell Non-Hodgkin Lymphoma

NHL is the most common cancer of the lymphatic system, with over 70,000 cases diagnosed each year in the United States, and approximately 85% of NHL cases are of B cell origin. Though B cell NHLs represent a heterogeneous set of lymphomas, many cell surface antigens are shared among them, including CD20.

Most subtypes of B cell NHL may be categorized as either indolent or aggressive. Indolent lymphomas are characterized by a prolonged median survival but are generally considered incurable. Aggressive lymphomas, in contrast, are characterized by more rapid growth but are potentially cured through either initial therapy or hematopoietic stem cell transplantation (HSCT). First-line therapy for patients diagnosed with B cell NHL usually consists of a combination of rituximab and multi-agent chemotherapy, which results in long term remissions or cures of approximately 50-60% of newly diagnosed patients. However, if initial therapy fails (i.e., remission is not achieved or the patient's lymphoma returns), sequential therapeutic interventions typically provide increasingly short-lived remissions. Second-line therapy usually includes other multi-agent chemotherapy regimens, often including platinum chemotherapeutics, with or without rituximab, and in some cases, HSCT. However, HSCT is only curative in a minority of cases and most patients advance to a drug resistant disease with limited treatment options.

CD20 is expressed on cancers of the lymphatic system of B cell lineage, such as CD20 positive (CD20+) B cell ALL in adults. In each of these B cell malignancies, available therapies for newly diagnosed patients include single or multi-agent chemotherapy with or without rituximab, which results in long term remission or cure in variable proportions of patients. However, absent an initial remission, or at the time of progression or relapse of the patient's underlying disease, curative treatment options remain extremely limited.

Clinical Development Plan

We are currently evaluating the safety, tolerability, and anti-lymphoma activity of ACTR087 used in combination with rituximab in adult patients with CD20+ B cell r/r NHL in an ongoing Phase I, multi-center, open-label clinical trial called ATTCK-20-2. The purpose of this trial is to evaluate safety, and the primary

endpoints of this trial are dose-limiting toxicities (DLTs), maximum tolerated dose, recommended Phase II dose, and safety as manifested by adverse events. Secondary endpoints are overall response rate (ORR), duration of response (DOR), progression free survival (PFS), and overall survival (OS). A standard "3+3" dose escalation design will define the optimal dose of ACTR087 when used in combination with rituximab. In a "3+3" dose escalation design, at least three patients are treated within each pre-specified dose level of ACTR087 with the FDA-approved dose level of rituximab. Each dose level is expanded to at least six patients if a single DLT is observed within the first three treated patients of that dose level. Prior to further clinical investigation beyond the dose-finding levels of ACTR087 used in combination with rituximab, the protocol requires that we assess at least six patients treated at the maximum tolerated dose of ACTR087, defined in the protocol primarily by DLTs. The maximum tolerated dose is the dose at which a DLT is observed in no more than one of these patients. Once the optimal dose has been determined, an expansion phase at this dose in multiple indications is planned.

Following signing of informed consent, screening to confirm eligibility, and trial enrollment, patients undergo leukapheresis. The leukapheresis cell collection is shipped to a GMP manufacturing facility, and following ACTR087 manufacturing and release, the drug product is returned to the appropriate clinical site. At that point, patients initiate their lymphodepleting chemotherapy with fludarabine and cyclophosphamide, followed by administration of rituximab and ACTR087. Rituximab is dosed every three weeks. Safety assessments, such as DLTs, determination of the maximum tolerated dose, determination of the recommended Phase II dose, adverse events, laboratory assessments, physical examinations and mini-mental state examination, and efficacy assessments, such as ORR, DOR, PFS, and OS, are delineated within the study protocol. The product candidate has cleared review by the Recombinant DNA Advisory Committee (RAC), of the National Institutes of Health and has an IND in effect with the FDA. Patient enrollment commenced in August 2016.

Twenty-three patients have been enrolled, and 17 patients have been treated with ACTR087. Of those patients not treated with ACTR087, four discontinued the trial early due to progression of their NHL, receiving no trial treatment, and two discontinued the trial due to serious adverse events (SAEs) that occurred prior to ACTR087 dosing. Dose Level One and Dose Level Two enrollment has been completed. Based on DLT events observed in Dose Level Two, we are not planning any further dose escalation with ACTR087 in this regimen, although the trial is ongoing and patient follow-up on study continues. We are advancing towards testing in an expanded patient cohort using an optimized dose of ACTR087 to support potential registration trials.

Seven patients were dosed with ACTR087 in Dose Level One, receiving a target dose of up to 0.5×10^6 ACTR T cells/kg, following lymphodepleting chemotherapy comprised of fludarabine and cyclophosphamide, a conditioning regimen widely used in T cell therapy, including CAR T cell therapy. We had a 100% success rate at manufacturing ACTR087 for all enrolled patients in Dose Level One. One patient experienced rapid disease progression and did not remain on study through DLT assessment and response assessment. Of the six patients who could be evaluated for response (i.e., remained on study until the first disease response assessment), two of these patients demonstrated a complete response, and a third patient demonstrated a partial response following ACTR087 and rituximab treatment, according to standard lymphoma response criteria (known as the Lugano criteria). The remaining three patients had progressive disease. Due to differences in patient weights and how closely we reached the target cell threshold (0.5×10^6 ACTR T cells/kg), the total cell dose that each patient received varied significantly. Within the Dose Level One dataset, we observed a correlation between total ACTR T cell dose and patient response. Of note, the two patients who received the two highest total doses of ACTR087 demonstrated complete response. The patient who received the lowest total dose exhibited progressive disease. The patient with a partial response received the second lowest total dose of ACTR T cells of those patients evaluable for response. As of March 7, 2018, our most recent data cutoff date for response assessment, one of the patients reaching complete response had an ongoing complete response extending over 422 days.

No severe ACTR087-related SAEs (i.e., Grade 3 or greater) or ACTR087-related deaths have been observed in Dose Level One patients. One DLT of Grade 4 thrombocytopenia persisting more than 14 days was observed, without associated bleeding complications. This patient's platelet count recovered, and subsequent modifications to the assessment of hematologic toxicities have been instituted, with no additional hematologic DLT observed in

Dose Level One. Other ACTR087-related SAEs include one event of Grade 2 dyspnea and one event of Grade 2 odynophagia. All patients who received ACTR087 experienced at least one treatment-emergent adverse event. Of the treatment-emergent adverse events that were severe, the majority were hematologic adverse events, including thrombocytopenia, neutropenia, leukopenia/decreased white blood cell count, lymphopenia, and one event each of subdural hematoma and meningitis cryptococcal. There were no other reported Grade 3 or higher adverse events in patients treated with ACTR087 at Dose Level One. All other treatment-emergent adverse effects, except for those summarized above, were mild or moderate in severity.

Ten patients were dosed with ACTR087 in Dose Level Two. Nine patients in Dose Level Two were treated with ACTR087 at a target dose of up to 1.5 x 10^6 ACTR T cells/kg, whereas one patient was treated with ACTR087 at an ACTR087 dose consistent with Dose Level One. We had a 100% success rate manufacturing ACTR087 for all enrolled patients in Dose Level Two. Of the six patients treated at Dose Level Two who had been evaluated for response as of March 7, 2018, our most recent data cutoff date for response, three patients demonstrated a partial response (one of which was ongoing) following ACTR087 used in combination with rituximab treatment according to the Lugano criteria. Three patients had progressive disease.

In Dose Level Two, two patients experienced ACTR087-related severe CRS and one patient experienced ACTR087-related neurotoxicity, which was fatal. Of the two events of CRS, one patient subsequently experienced a fatal case of enterococcal sepsis considered related to ACTR087 and one patient subsequently experienced a fatal case of sepsis considered not related to ACTR087. There were three protocol-defined DLTs in Dose Level Two, including one of the events of severe CRS, the neurotoxicity event, and a hematologic DLT of prolonged (lasting greater than 28 days) Grade 4 thrombocytopenia. Based on this review of the observed safety events, we concluded that Dose Level Two exceeds the maximum tolerated dose under the standard rituximab dosing regimen and do not intend to further escalate the cell dose in this regimen. Other ACTR087-related SAEs in Dose Level Two include one event each of Grade 1 CRS and Grade 2 CRS. All patients who received ACTR087 experienced at least one treatment-emergent adverse event. Of the treatment-emergent adverse events that were severe and not otherwise reported as serious events, the majority were hematologic adverse events, including thrombocytopenia, neutropenia, and anemia. Other reported Grade 3 or higher adverse events in patients treated with ACTR087 in Dose Level Two included sepsis, febrile neutropenia, large intestine perforation, ascites, and transaminase increase. All other treatment-emergent adverse events, except for those summarized above, were mild or moderate in severity.

The severe ACTR087-related SAEs we observed in Dose Level Two resulted in the FDA placing this trial on clinical hold in December 2017 pending submission of certain information relating to the ATTCK-20-2 clinical trial. The clinical hold was removed in February 2018, following review of this information by the FDA. Several protocol and dosing changes were made in early 2018, which we expect to reduce the incidence of severe adverse events and better manage those events that do occur. Correlative analyses of the data identified ACTR087 dose as the strongest potential predictor of severe non-hematologic adverse events.

Available safety and response data for Dose Level One and Dose Level Two of ATTCK-20-2 were reported at the American Society of Hematology meeting in Atlanta, Georgia, in December 2017. These data have informed the ongoing development of ACTR087 used in combination with rituximab in CD20+ B cell NHL, most immediately in defining the preliminary recommended phase 2 dose (RP2D) for the expansion cohort in this clinical trial. These data will also inform a multi-center Phase II clinical trial exploring ACTR087 used in combination with rituximab in adult patients with r/r NHL who received prior CD19 CAR therapy.

ACTR707 Used in Combination with Rituximab for B Cell Non-Hodgkin Lymphoma

ACTR707 represents an important construct not only for adult patients with CD20+ B cell r/r NHL, when used in combination with rituximab, but also for patients with other cancer types when used in combination with other antibodies. We believe important structural modifications to the ACTR707 construct, including changes to the hinge, transmembrane, and co-stimulatory domain, will translate into meaningful clinical differences when used in combination with antibody therapeutics. ACTR707 was identified through a comprehensive high-throughput

screening effort aimed at identifying constructs with properties that would function particularly well in a solid tumor setting (including increased proliferation, cytokine secretion, and persistence in a repeat stimulation test). In particular, we believe that the modifications in ACTR707 will allow the ACTR T cells to behave more favorably in immunosuppressive tumor microenvironments commonly found in solid tumor cancers. As a first-step, we are testing ACTR707 as a proof of concept in a Phase I multi-center open label clinical trial, ATTCK-20-03, in combination with rituximab, to enable rapid assessment of this alternative construct.

Clinical Development Plan

We are currently evaluating the safety, tolerability, and anti-lymphoma activity of ACTR707 used in combination with rituximab in adult patients with CD20+ B cell r/r NHL in a Phase I, multi-center, open-label clinical trial called ATTCK-20-03. The primary endpoints of this trial are DLTs, maximum tolerated dose, and incidence and severity of adverse events. Secondary endpoints are efficacy (as measured by ORR, DOR, PFS, OS), ACTR T cell persistence, level of inflammatory markers and cytokines, and rituximab pharmacokinetics (as measured by plasma concentration of rituximab and anti-drug antibody titers). An adaptive design is being used to identify a dose of ACTR707 when administered in combination with rituximab to be used in future trials. In the United States, an IND was submitted in April 2017, and the protocol was recommended by local Institutional Biosafety Committees (IBCs) for NIH waivers of RAC review, which NIH granted.

As of March 7, 2018, we had enrolled six patients in ATTCK-20-03 in the first dose level of 40 x 10^6 ACTR T cells. Enrollment to this dose level is complete. Of the six patients enrolled, three have been dosed with ACTR707 and three are scheduled to be dosed with ACTR707. As of March 7, 2018, of the three patients dosed with ACTR707, one was in the DLT assessment period, one discontinued the trial due to disease progression during the DLT assessment period, and a third remained on trial treatment following an indeterminate assessment at the first response assessment at day 42. The only reported ACTR707-related SAE, Grade 3 febrile neutropenia, has resolved.

ATTCK-20-03 design is similar to ATTCK-20-2 in that the primary objective is safety, although anti-lymphoma activity will also be assessed. The key differences are that ATTCK-20-03 is designed to investigate three ‘flat’ dose levels of ACTR707, meaning that the doses do not vary by patient weight. For the first cohort, we are administering a flat dose of 40 x 10^6 ACTR T cells. Dose escalation will be followed by up to two expansion levels of the combination at the recommended Phase II dose of ACTR707. The decision to escalate dose and the number of patients in each level are defined by statistical testing drawing from the cumulative safety observations across all previous levels. This design, in comparison to the more traditional “3+3” design, is anticipated to provide greater flexibility in identifying the dose of ACTR707 used in combination with rituximab to be used in future studies.

We expect to report initial data from ATTCK-20-03 in the fourth quarter of 2018 and continuing enrolling patients in this trial into 2019. We expect to leverage data from the Phase I clinical trial to inform future studies combining ACTR707 with a variety of antibodies targeting different cancers, including one combination, ACTR707 used in combination with trastuzumab, that we plan to evaluate for treatment of HER2+ cancers.

ACTR087 Used in Combination with SEA-BCMA for Multiple Myeloma

Our third clinical product candidate is ACTR087 used in combination with SEA-BCMA, which we are currently testing in adult patients with r/r multiple myeloma. SEA-BCMA is a novel humanized antibody that targets the antigen BCMA, developed by Seattle Genetics using their sugar-engineered antibody (SEA) technology. BCMA is expressed on normal plasma cells, some mature B cells, and at comparatively elevated levels on malignant multiple myeloma cells, but is absent from other normal tissues. We believe BCMA presents an attractive immunotherapeutic target for our platform.

Multiple Myeloma

Multiple myeloma, a cancer arising from normal plasma cells, which are of B cell lineage, is diagnosed in approximately 30,000 patients in the United States every year, making it the second most common hematologic malignancy. First-line treatment increasingly involves a three-drug regimen that includes a proteasome inhibitor such as bortezomib or carfilzomib, an immunomodulatory drug such as lenalidomide, and a corticosteroid such as dexamethasone, though if a patient is fit enough they may proceed to autologous HSCT in their first complete remission. First-line therapy typically leads to complete remission, but invariably the disease relapses or progresses, even following HSCT, necessitating subsequent therapy. Several therapeutic options exist for patients with progressive or relapsed multiple myeloma, including recently approved new classes of agents such as monoclonal antibodies. Retreatment with drugs used in first-line therapy, or other drugs within their class, is also feasible, but in most cases subsequent remissions are of shorter duration or cumulative toxicities preclude continuation of existing therapies.

We are developing ACTR087 used in combination with SEA-BCMA, a novel proprietary first-in-human monoclonal antibody that targets the antigen BCMA, which is widely expressed in multiple myeloma. The ACTR087 used in combination with SEA-BCMA product candidate represents the first clinical product candidate arising from our strategic collaboration with Seattle Genetics, as well as our first clinical product candidate incorporating a novel antibody. SEA-BCMA is engineered to enhance its binding to ACTR087, providing additional rationale for this novel-novel combination.

Clinical Development Plan

We are currently testing the safety, tolerability, and anti-myeloma activity of ACTR087 used in combination with SEA-BCMA in adult patients with r/r multiple myeloma in a Phase I, multi-center, open-label clinical trial called ATTCK-17-01. The primary endpoints of this trial are recommended Phase II dose, DLTs, and incidence and severity of adverse events. Secondary endpoints are efficacy (as measured by ORR, DOR, PFS, OS), ACTR T cell persistence, level of inflammatory markers and cytokines, pre-treatment BCMA expression on multiple myeloma cells, and SEA-BCMA pharmacokinetics (as measured by plasma concentration of SEA-BCMA and anti-drug antibody titers). The trial is designed as a dose escalation trial, increasing levels of both ACTR087 and SEA-BCMA. A safe and effective dose of SEA-BCMA has not been previously defined in humans. ATTCK-17-01 is designed to identify both a dose of ACTR087 and SEA-BCMA in combination for use in subsequent clinical trials. Similar to ATTCK-20-03, an adaptive dose escalation study design is being used. Two ACTR087 and up to six SEA-BCMA dose levels may be studied in this trial. We submitted an IND in July 2017. The protocol was recommended by local IBCs for NIH waivers of RAC review, which NIH granted. We are currently enrolling and dosing patients in this trial and we expect to report initial data from ATTCK-17-01 in the fourth quarter of 2018. As of March 7, 2018, one patient was enrolled in ATTCK-17-01 in the first dose level. The patient started treatment with SEA-BCMA at 0.03 mg/kg and is anticipated to receive an ACTR087 (40 x 10^6 ACTR T cells) infusion in April 2018.

Data from ATTCK-17-01 will inform the ongoing development of the ACTR087 used in combination with SEA-BCMA product candidate for treatment of multiple myeloma. In ATTCK-17-01, we are testing ACTR087 used in combination with SEA-BCMA in patients that have relapsed, progressed, or are no longer responding to treatment after at least three or more lines of therapy for their multiple myeloma, or are double refractory to a proteasome inhibitor and an immunomodulatory agent, regardless of the number of prior therapies. Patients must have received adequate available therapies, including HSCT for those who are eligible to receive HSCT. We also anticipate that in the future we may study patients with other BCMA-expressing malignancies with ACTR087 used in combination with SEA-BCMA. Initiation of new clinical trials with ACTR087 used in combination with SEA-BCMA will depend upon the tolerability and anti-myeloma activity observed in ATTCK-17-01.

ACTR707 Used in Combination with Trastuzumab for HER2+ Cancers

We are currently in late-stage preclinical development of ACTR707 used in combination with trastuzumab for the treatment of patients with cancers that overexpress HER2. Trastuzumab is a humanized monoclonal antibody that targets the HER2 cell surface receptor, and is currently approved to treat HER2+ breast cancers and

HER2+ gastric cancers alone and in combination with chemotherapy. While HER2 is overexpressed in a subset of breast and gastric cancers, it is found at very low levels on certain tissues within the body. In preclinical studies, we have shown antigen-specific killing of HER2-overexpressing cell lines with ACTR707 used in combination with trastuzumab, without observing cytotoxic effects in normal cells expressing low amounts of HER2. ACTR707 used in combination with trastuzumab also induces remissions in relevant mouse models of HER2+ cancers.

HER2+ Cancers

Amplification of the ERBB2 gene leads to the overexpression of HER2, a major driver of cell proliferation for a subset of patients with breast and gastric cancers. As many as 37,500 women in the United States, or approximately 15% of all women diagnosed annually with breast cancer, overexpress the HER2 antigen. At least 4,000 patients with gastric cancer in the United States are HER2 positive as well. The development of HER2-directed therapies, including monoclonal antibodies such as trastuzumab and pertuzumab, have substantially improved outcomes for women with HER2+ breast cancer and demonstrated clinical benefit for women in the neo-adjuvant and adjuvant setting (preceding or following definitive local therapy). Women with advanced or metastatic breast cancer may constitute as many as 8,000 patients per year in the United States, and while HER2-directed therapies, such as trastuzumab and pertuzumab, trastuzumab-DM1, and HER2-directed small molecule inhibitors such as lapatinib are available, no curative options exist. Likewise, while trastuzumab has improved outcomes for the subset of patients with HER2+ advanced or metastatic gastric/gastroesophageal junction cancers, relapse or progression is almost inevitable.

Clinical Development Plan

We plan to file an IND of ACTR707 used in combination with trastuzumab in HER2+ cancers in 2018. Subsequent clinical development of this product candidate will depend upon the safety and efficacy data observed in the Phase I clinical trial.

Additional Product Candidates

We are exploring the potential of our universal ACTR platform in combination with a wide range of tumor-targeting antibodies to pursue hematologic and solid tumor cancers with significant unmet medical needs. We are working on a number of product candidates in early clinical or late-stage preclinical development. We plan to leverage the investment we have already made in ACTR, and the clinical validation and de-risking of ACTR that we are looking to achieve through the current clinical trials, to rapidly expand our pipeline of ACTR-based therapies using both commercially available and de-risked antibodies, as well as antibodies in clinical and preclinical development.

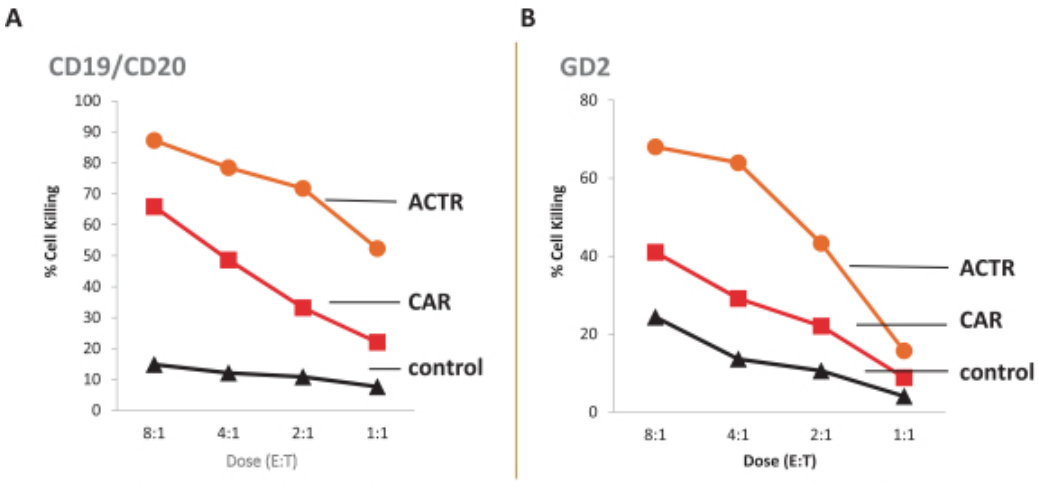
Preclinical Data

Activity

An important factor in the efficacy of cell therapies is potency: the ability to drive efficient tumor cell killing.

As shown in panel (A), lymphoma-derived Daudi cells expressing both CD19 and CD20 antigens were targeted in an experiment using T cells modified with either a CD19 CAR or with ACTR combined with rituximab. The CD19 CAR tested in this experiment is the same CAR construct used in Kymriah, a CAR-T therapy recently approved for pediatric ALL. ACTR exhibited stronger activity relative to the CAR under all conditions.

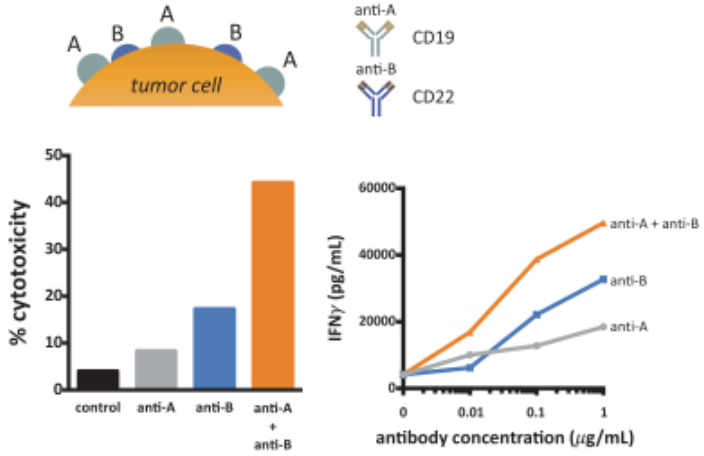
In the study shown in panel (B), both ACTR and CAR were directed to attack the same antigen (GD2) using the same antibody, formatted as an IgG for use with ACTR or as an scFv for use as a CAR. Both tested ACTR and CAR constructs rely upon the same intracellular signaling components (4-1BB and CD3zeta). ACTR outperformed CAR at all tested concentrations. In both figures, the percent of tumor cells killed by each administration is plotted as a function of the ratio of effector T cells to tumor cells.



ACTR = ACTR087 + Rituximab
CAR = anti-CD19-41BB-CD3z CAR
Control = T cells with no chimeric receptor

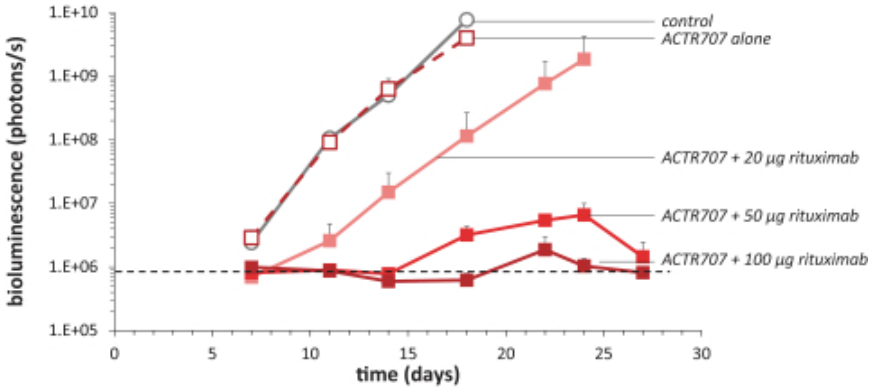
ACTR = ACTR087 + hu14.18K322A
CAR = hu14.18K322A-41BB-CD3z CAR
Control = T cells with no chimeric receptor

By effectively separating tumor cell targeting and tumor cell killing into the two components that make up an ACTR-antibody combination, we have created a universal ACTR T cell that is intended to be used with a wide range of tumor-targeting antibodies. We believe ACTR T cells can be used in combination with more than one type of antibody to more effectively attack a tumor without having to re-engineer the ACTR T cell, which gives ACTR flexibility in use that is difficult or impossible to achieve with CARs. The figure below shows the results of an *in vitro* experiment in which ACTR T cells were directed to attack tumor cells using two types of antibodies against two distinct tumor antigens, CD19 and CD22. The combination shows increased activity, demonstrating better tumor cell killing than obtained with either antibody alone.



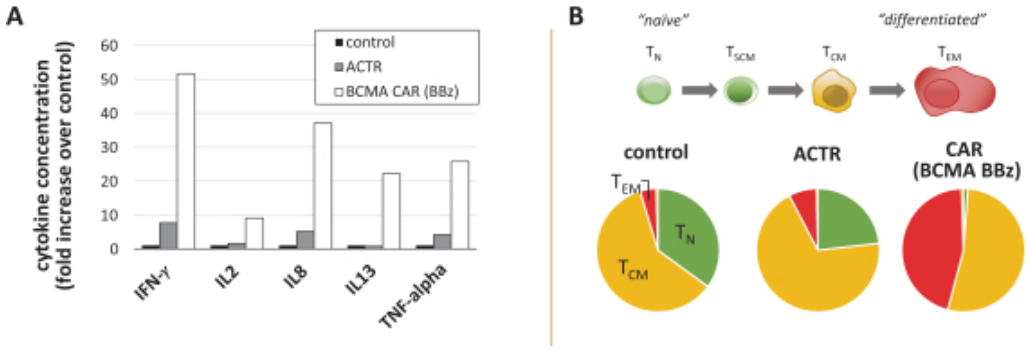
Controlling Activity

We believe ACTR has intrinsic advantages as a cell therapy because of our ability to adjust its activity by modulating antibody dosing in clinical studies. In the *in vivo* experiment shown below, ACTR T cell activity was assessed with a stringent xenograft model using bioluminescent Raji cells administered by IV injection. The amount of the targeting antibody was systematically increased to change the level of cytotoxic killing. At a low dose of rituximab, tumor growth is slowed (as demonstrated by reduced bioluminescence). At higher doses, tumors are completely cleared.



Solid Tumors

Solid tumors create a tumor microenvironment that is hostile to T cells and reduces their functionality. To sustain solid tumor killing activity, it is important to prevent T cells from converting into differentiated and exhausted cell types known to have limited anti-tumor activity. Several lines of evidence indicate that tonic signaling, activation of T cells in the absence of a target, drives T cell differentiation. Using cytokine secretion in the absence of tumor cells as a measure of tonic signaling, we find that ACTR T cells have very low activity (panel A in the figure below). As a result, ACTR T cells maintain a “naïve” phenotype, enriched for cell types that correlate with potent anti-tumor activity (panel B in the figure below). In contrast, CARs are known to signal in the absence of target cells as a result of misfolding and receptor aggregation. As shown below for one such CAR targeting BCMA, we see much higher background signaling (high cytokine secretion in the absence of tumor cells) and correspondingly, a much higher proportion of differentiated CAR-T cell types. We believe reduced tonic signaling is an intrinsic advantage of ACTR T cells that should translate into potent cell killing in solid tumor cancers.

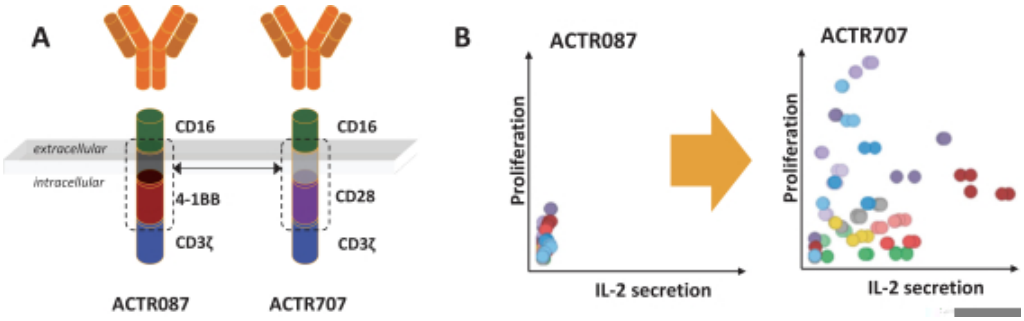


Understanding the stringent requirements for T cell function in the immunosuppressive environment of solid tumors, we have pursued a high throughput screening approach to identify ACTR constructs that may perform

better in this setting. We initially assembled over a hundred ACTR constructs by combining functional domains from a number of different starting genes. We evaluated these constructs using *in vitro* and *in vivo* screening tests to assess expected functionality in a solid tumor environment, including sustained high-level cytokine secretion, sustained proliferation, cytotoxicity, and resistance to exhaustion.

Through this screening effort, we identified ACTR707 as an ACTR construct with enhanced activity against a number of hematologic and solid tumor cancers. Relative to ACTR087, ACTR707 is modified in terms of its costimulatory domain (CD28 versus 4-1BB) and the hinge and transmembrane domains that bridge the extracellular and intracellular components (panel A in the figure below). These changes translate into significant differences in IL-2 secretion and proliferation in response to tumor cells (panel B in the figure below). Both features are expected to be especially important in targeting solid tumors.

Panel B in the figure below shows the results from our in vitro evaluation of IL-2 secretion for each of ACTR087 and ACTR707. The solid tumor microenvironment lacks cytokines that promote T cell growth and function, either because they are not produced, or because they are competitively consumed by cells in the tumor (e.g., IL-2 by T regulatory cells). Increased IL-2 secretion by ACTR707 is expected to counteract this effect. Each set of points with the same color in panel B represents a different antibody plus cell line combination, evaluated at different concentrations. The cell lines are derived from both hematologic and solid tumors.



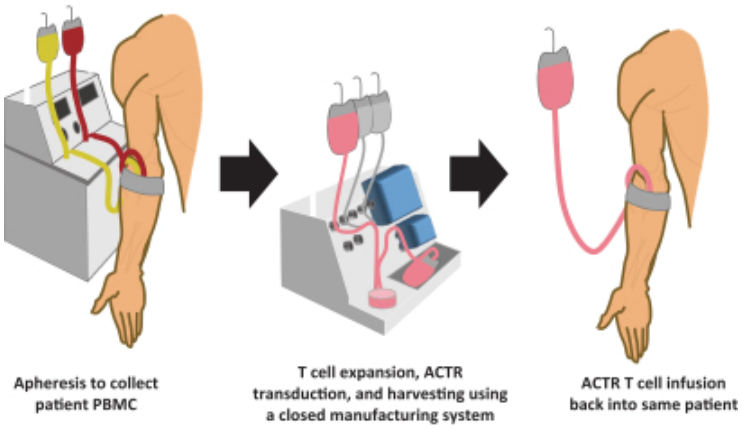
Product Development and Manufacturing

The ACTR process is designed as an automated, closed system that uses a serum-free growth medium and other materials that are readily available from qualified suppliers. Because ACTR is a platform technology that can target a wide variety of antigens using a single viral vector, we are refining a platform manufacturing process that is expected to address multiple indications with little or no modification. We understand that the T cell therapy field, including manufacturing and analytical technology, is evolving rapidly and have invested in process development tools, such as high-throughput liquid handling and flow cytometry, design of experiments, and data analysis software in order to map the design space and develop multiple options for processing that can be rapidly deployed to exploit new indications or new discoveries.

In our process, patients initially undergo a laboratory procedure in which white blood cells are removed from the bloodstream (known as leukapheresis), to yield peripheral blood mononuclear cells (PBMCs) that serve as the starting point for ACTR T cell manufacture. Collected PBMCs are transferred to a central GMP manufacturing facility, where they are enriched, activated, and cultured to promote optimal T cell functionality. T cells are then transduced with a non-replicating gamma-retroviral vector containing the ACTR transgene. The culture is incubated for several days to allow the T cell population to expand to the desired dose level. Once expansion has completed, cells are harvested, formulated, packaged, and cryopreserved for shipment back to the clinic for infusion into the same patient from whom the white blood cells were removed. ACTR is currently administered as a single infusion, following preparatory lymphodepletion.

ACTR product is dosed based on the total number of cells expressing the ACTR transgene. The manufacturing process can take from six days to 12 days, depending on the desired dose for a given patient. This manufacturing timeline is typical for the therapeutic T cell industry and can potentially be further optimized. ACTR product is tested using a panel of release assays that assess the safety and suitability of the product candidate for clinical trials. Suitability is controlled through specifications that include the purity of the T cell population and the quantity of ACTR T cells in the final product. Safety is controlled via specifications on appearance, endotoxin, and the absence of microbial contamination and replication-competent viral vector.

An illustration of the manufacturing process is shown in the graphic below:



Commercialization Plan

We currently have no sales, marketing, or commercial product distribution capabilities and have no experience as a company in marketing products. We intend to expand our global commercialization capabilities over time.

As a first step, we plan to establish a U.S.-focused specialty sales and marketing organization in advance of receipt of regulatory approval of our first ACTR product. We believe that in the United States we can address physicians who treat our proposed clinical indications with a direct specialty sales force. Our commercial strategy for markets outside the United States may include the use of strategic partners or the establishment of our own commercial capabilities. We plan to further evaluate these alternatives as we approach approval of our first ACTR product.

We intend to leverage the infrastructure developed for our first approved ACTR product to facilitate commercialization of any additional product candidates for which we gain approval. In addition, we will build upon physicians' familiarity and experience with the first ACTR product to accelerate adoption of subsequent combinations. As additional product candidates advance through our pipeline, our commercial plans may change. In particular, some of our pipeline assets target potentially large solid tumor cancer indications. The potentially large amount of data, the size of the development programs, as well as the size of the target market and thus that of a commercial infrastructure and manufacturing capacity to address such market, may all influence our U.S., European Union (EU), and rest-of-world strategies.

For co-developed products under our collaboration with Seattle Genetics, if successful we will co-commercialize them with Seattle Genetics in the United States, and Seattle Genetics will commercialize them outside of the United States.

Intellectual Property

Intellectual property is an important component of our assets. We are working to establish both strong patent protection and trade secrets to position us as a leader in the practice of ACTR technology. Our efforts include our proprietary technology development as well as licensing patent rights from third parties. In doing so, we have strived to ensure our ability to operate freely within the complex patent landscape of cell therapy. To date, one European patent has issued from our in-license portfolio, but no other patents have issued from the patent applications that we own or in-license.

The ACTR platform was initially conceived and developed in the laboratories of our scientific founder, Dr. Dario Campana, who was working initially as an investigator at St. Jude Children's Research Hospital (St. Jude's) and subsequently at the National University of Singapore (NUS). The original patent application describing ACTR087 was filed in 2013. A worldwide, exclusive license to the patent rights resulting from this work was executed between us, St. Jude's, and NUS in 2014.

Our further work at encompassing a broad range of ACTR constructs was completed and described in subsequent patent applications filed in 2014. Additional patent applications filed by us between 2014 and 2017 encompass the following additional technological innovations and product-related claims:

- engineered ACTR constructs that specifically engage synthetic (i.e., not endogenous) antibodies.
- targeting non-traditional tumor-target antigens with ACTR (e.g., peptides bound to MHC).
- using ACTR with mixtures of antibodies to simultaneously target multiple antigens or epitopes.
- methods of using ACTR and rituximab to treat lymphoma.
- methods of using ACTR and other antibodies to treat other cancer indications.
- next-generation ACTR constructs with improved functionality in solid tumor cancers.

Our strategy is to pursue a variety of claims intended to provide multiple layers of protection. These include:

- pursuing broad claims in the U.S. for the ACTR concept (which we define as a chimeric receptor with the functional properties of Fc binding, T cell co-stimulation, and TCR signaling activity).
- pursuing claims to specific compositions of matter in connection with particular ACTR constructs (including specific protein and nucleic acid sequences).
- different methods of delivering ACTR to T cells, including viral vectors and mRNA.
- methods of using the ACTR platform in combination with antibodies to specified tumor-target antigens to treat disease.
- methods of using specific ACTR constructs in combination with specific monoclonal antibodies to specific tumor-target antigens to treat disease.

All of the patent applications that we own or license, including the original ACTR filings, are still in the early stages of prosecution and no claims have yet issued, other than a European patent from the licensed-in case. Examination of most of the patent applications that we own has not yet commenced, because they are either provisional applications or Patent Cooperation Treaty (PCT) applications. We will need to decide whether and where to pursue protection for the inventions disclosed in these provisional and PCT applications before applicable statutory deadlines, our applications will only be examined in jurisdictions where we elect to pursue protection, and we will only have the opportunity to attempt to obtain patents in such jurisdictions where we elect to pursue protection.

Under the terms of our agreement with NUS and St. Jude's, we have the right to review and comment on all correspondence and proposed responses to office actions and to provide consultation and input on all strategic decisions with respect to filing, prosecution, and maintenance of the licensed patents. We are seeking protection across a range of commercially important territories, including countries in North America, Europe, and Asia.

Our ACTR therapies require the use of commercially available antibodies (e.g., rituximab and trastuzumab, as used in our current clinical trials) or antibodies in preclinical or clinical development (e.g., SEA-BCMA, as used in our current clinical trials) for targeting cancer cells. These commercially available antibodies and antibodies in preclinical/clinical development are developed by third parties. More specifically, rituximab is jointly marketed by Biogen Inc. (Biogen) and Genentech, Inc. (Genentech) (a subsidiary of The Roche Group (Roche)); trastuzumab is marketed by Genentech (Roche); and SEA-BCMA is being developed by Seattle Genetics.

We do not own intellectual property, including patents, over these commercially available antibodies and antibodies in preclinical/clinical development *per se*. For commercially available antibodies, such as rituximab and trastuzumab, we rely on our ability to purchase them on commercially reasonable terms for the clinical trials and their availability for commercialized product. For antibodies in preclinical/clinical development, such as SEA-BCMA, we have formed a strategic partnership with Seattle Genetics under which we have access to the antibodies for clinical trials and development of commercial products.

With respect to rituximab (Rituxan®), Biogen's Form 10-K filed on February 4, 2015 states:

> We have several U.S. patents and patent applications, and numerous corresponding foreign counterparts, directed to anti-CD20 antibody technology, including RITUXAN. The principal patents with claims to RITUXAN or its uses expire in the U.S. between 2015 and 2018 and expired in the rest of the world in 2013, subject to any available patent term extensions. In addition, we and our collaborator Genentech, have additional patents and patent applications directed to anti-CD20 antibodies and their uses to treat various diseases. Genentech has principal responsibility for managing the intellectual property portfolio for RITUXAN and the other anti-CD20 antibodies under our agreements with Genentech.

With respect to trastuzumab (Herceptin®), the latest publicly available information from Genentech in its Form 10-K filed on February 20, 2009 listed the following last-to-expire, product-specific U.S. patents:

Product	Last-to-Expire Product-Specific U.S. Patents	Year of Expiration
Herceptin	6,339,142	2019
	6,407,213	2019
	7,074,404	2019

With respect to SEA-BCMA, Seattle Genetics has not provided any information regarding any relevant patents and patent applications publicly.

The effective term for individual patents varies based upon a number of factors including the date of patent application filing and the date of patent issuance, the territory within which protection is sought, and certain adjustments to patent term tied to regulatory review. Patents in both the U.S. and many other territories generally have an effective term of 20 years from the earliest filing date. Based on its initial filing date, should any patents issue from the ACTR core patent family, the 20-year term of such patents would be expected to expire in 2034. The actual protection afforded by any patents that may issue, if any patents do issue, is expected to vary across different ACTR plus antibody products and depends upon the claimed territory, the scope of claim coverage, the availability of extensions due to regulatory review, validity and enforceability of the claims, and a number of additional factors.

We are not currently a party and have not been a party to any legal proceedings involving patent rights.

The intellectual property value of companies like ours is intrinsically uncertain and involves complex legal and scientific questions. Competitors may commercialize products that infringe our intellectual property if we are unable to both obtain and enforce patent claims protecting our inventions. Our currently pending and future

patent applications may not be granted. If granted, our patents may be challenged, invalidated, or circumvented, thereby limiting our ability to stop competitors from marketing related products. Future changes to patent laws (or their interpretation) may limit our ability to protect our inventions and to enforce our patent rights. Any such changes may adversely impact the value ascribed to our intellectual property. Others with related but distinct technology may have freedom to operate and effectively compete with us. Moreover, patents issued to competitors may limit or prevent our ability to practice the ACTR technology and to commercialize ACTR products. In addition, because of the extensive time required for development, testing and regulatory review of a potential product, it is possible that, before any particular product candidate can be commercialized, any related patent may expire or remain in force for only a short period following commercialization, thereby reducing any advantage of the patent.

We seek to protect our technology and product candidates, in part, by entering into confidentiality agreements with those who have access to our confidential information, including our employees, contractors, consultants, collaborators, and advisors. We also seek to preserve the integrity and confidentiality of our proprietary technology and processes by maintaining physical security of our premises and physical and electronic security of our information technology systems. Although we have confidence in these individuals, organizations, and systems, agreements or security measures may be breached and we may not have adequate remedies for any breach. In addition, our trade secrets may otherwise become known or may be independently discovered by competitors. To the extent that our employees, contractors, consultants, collaborators, and advisors use intellectual property owned by others in their work for us, disputes may arise as to the rights in related or resulting know-how and inventions. For this and more comprehensive risks related to our proprietary technology, inventions, improvements and products, please see the section on “Risk Factors—Risks Related to Intellectual Property.”

Our trademark portfolio currently contains registrations in China, EUTM, Japan, Singapore, and the United States as well as a registration at WIPO under the Madrid Protocol.

Licenses and Third-Party Research Collaborations

Strategic Collaboration with Seattle Genetics

In June 2015, we entered into a collaboration agreement with Seattle Genetics to identify, research, develop, and commercialize novel antibody-coupled ACTR therapies incorporating Seattle Genetics’ antibodies for the treatment of cancer. We formed a strategic partnership with Seattle Genetics because of its leadership in the discovery, development, and manufacturing of antibody-based therapies for cancer. Under this agreement, we are actively working on developing ACTR combination therapies for two target antigens. The first product candidate under our collaboration is ACTR087 used in combination with SEA-BCMA, targeting the BCMA antigen. We have not yet disclosed the target antigen of the second product candidate under our collaboration. Under the agreement, Seattle Genetics had an option to nominate a third antigen; this option expired unexercised in June 2017.

Under the terms of the collaboration, Unum will conduct preclinical research and clinical development activities through Phase I clinical trials, and Seattle Genetics will provide all of the funding for those activities. We will work together to co-develop and fund product candidates after Phase I clinical trials unless either company opts out of further development and commercialization activities. Seattle Genetics has the option to opt-out from further development and commercialization activities for each of the two product candidates under the collaboration during two specified periods subsequent to Phase I clinical development. We have an option to opt-out from further development and commercialization activities for each of the two product candidates under the collaboration during a specified period subsequent to Phase II clinical development. If neither party elects to opt-out of further development and commercialization activities, we will co-commercialize any successful developed product candidates and share equally any profits and losses on any co-developed product candidates in the United States. Seattle Genetics retains exclusive commercial rights outside of the United States.

Through December 31, 2017, we had received $25.0 million in upfront payments, $5.0 million in equity investment in our Series B preferred stock financing, and $7.5 million in research and development funding under our collaboration agreement. As of December 31, 2017, we were eligible to receive future collaboration and milestone payments of up to an aggregate of $400.0 million, payments of which are due upon the achievement of specified development, regulatory, and commercial milestones or the occurrence of specific events. During the term of the agreement, we will share equally all profits and losses related to the commercialization of any co-developed products in the United States. We are entitled to receive tiered royalties in the high single digit to mid-teens percentages on net sales achieved outside of the United States for each co-developed product.

Unless earlier terminated, our collaboration agreement will expire on a product-by-product basis in the United States on the date on which neither party is researching, developing or commercializing such product. Outside of the United States, our collaboration agreement will expire on a product-by-product and country-by-country basis at the end of the applicable royalty term for such product in such country. The royalty term will be in effect beginning at the first commercial sale of a product and ending upon the later to occur of (i) expiration of the last valid claim within any patent right that we or Seattle Genetics has that would be infringed by the manufacture, use, sale, offer for sale, or importation of such product in such country, (ii) the end of any regulatory exclusivity periods that apply to the manufacture, use, sale, offer for sale, or importation of such product in such country, or (iii) ten years from the first commercial sale of such product in such country.

License Agreement with National University of Singapore and St. Jude Children's Research Hospital

In August 2014, we entered into a license agreement with the National University of Singapore (NUS) and St. Jude's that grants us an exclusive, worldwide, sublicensable license to certain patent rights and to intellectual property rights related to certain know-how to develop, make, and commercialize licensed products and to perform services for all therapeutic and diagnostic uses. The agreement was subsequently amended twice. The patent applications covered by this agreement are directed to specific ACTR constructs, including ACTR087 and their use in immunotherapy. Pursuant to this license agreement, we have rights to one pending U.S. non-provisional patent application and the corresponding Patent Cooperation Treaty counterpart application, and other counterpart patent applications in jurisdictions outside the United States. The U.S. provisional applications under this license agreement have expired.

In 2014, we made payments of $0.1 million. We are required to pay license maintenance fees on each anniversary of the effective date of the agreement that escalate from less than $0.1 million for each of the first seven years to $0.1 million on the eighth anniversary and each year thereafter. The license agreement requires us to pay tiered royalties ranging in the low single-digit percentages based on annual net sales of licensed products. In the case that multiple royalty streams are required, due to multiple licenses required for marketed products or services, royalty fees for this technology may be reduced. We may also be obligated to pay up to a maximum of 5.5 million Singapore dollars (equivalent to approximately $4.1 million as of December 31, 2017) in one-time clinical and regulatory milestones related to the development of the first licensed product to hit such milestones. Licensed products could include at least ACTR087. In addition, we are required to pay a low double-digit percentage of certain payments that we receive, if these qualify as sublicensing income, as defined in the license agreement. Through December 31, 2017, we had paid a total of $0.1 million.

The license agreement will expire, on a country-by-country basis until the last to expire of the patents and patent applications covering such licensed product or service. NUS may terminate the license agreement within 60 days after written notice in the event of a breach of contract. NUS may also terminate the agreement upon written notice in the event of our bankruptcy, liquidation, or insolvency. In addition, we have the right to terminate this agreement in its entirety at will upon 90 days' advance written notice to NUS. However, if we have commenced the commercialization of licensed products, we can only terminate at will if we cease all development and commercialization of licensed products.

Competition

The biotechnology and pharmaceutical industries, including the oncology subsector, are characterized by rapidly advancing technologies, intense competition, and a strong emphasis on intellectual property. Any candidates that we successfully develop and commercialize will have to compete with any existing therapies as well as therapies that may be developed in the future. While we believe our ACTR platform and scientific expertise provide us with competitive advantages, we face substantial competition from many different sources, including large and specialty pharmaceutical companies and biotechnology companies, academic research institutions and governmental agencies, and public and private research institutions.

Due to their promising clinical therapeutic effect in clinical trials, we anticipate substantial direct competition from other organizations developing advanced T cell therapies and other types of oncology therapies. In particular, we expect to compete with:

- Companies genetically engineering T cells with CARs that are reactive to tumor associated antigens. In particular, Kite Pharma, Inc. (a Gilead Sciences, Inc. company), Juno Therapeutics, Inc. (which was recently acquired by Celgene Corporation), Novartis AG, and bluebird bio, Inc. In addition, some companies, such as Cellectis SA, are developing allogeneic cell therapies that could compete with our products.
- Companies genetically engineering T cells with TCRs that are reactive to tumor associated antigens. In particular, Adaptimmune Therapeutics plc, Kite Pharma, Inc. (a Gilead Sciences, Inc. company), and Juno Therapeutics, Inc.
- Companies developing bi-specific antibodies that bring T cells and tumor cells into close proximity with each other. In particular, Macrogenics, Inc., Amgen Inc., Roche Holding AG, and Genmab A/S.
- Companies developing other immune cells that can be targeted using antibodies, such as NantKwest, Inc.

We believe that other known types of immunotherapies, such as certain check-point inhibitors, may be used in conjunction with ACTR platform to increase efficacy. However, we cannot predict whether other types of immunotherapies may be developed and show greater efficacy and we may have direct and substantial competition from such immunotherapies in the future. Such immunotherapies are being pursued by several biotech companies as well as by large-cap pharma. Many of our current or potential competitors, 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. Mergers and acquisitions in the pharmaceutical, biotechnology, and gene therapy 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 product candidates.

Government Regulation

Government authorities in the United States, at the federal, state, and local level, and in other countries and jurisdictions, including the European Union, extensively regulate, among other things, the research, development, testing, manufacture, quality control, approval, packaging, storage, recordkeeping, labeling, advertising, promotion, distribution, marketing, post-approval monitoring and reporting, and import and export of pharmaceutical products, including biological products. In addition, some jurisdictions regulate the pricing of pharmaceutical products. The processes for obtaining regulatory approvals in the United States and in foreign countries and jurisdictions, along with subsequent compliance with applicable statutes and regulations and other regulatory authorities, require the expenditure of substantial time and financial resources.

Licensure and Regulation of Biologics in the United States

In the United States, our candidate products are regulated as biological products (biologics), under the Public Health Service Act (PHSA), and the Federal Food, Drug, and Cosmetic Act (FDCA), and their implementing regulations. The failure to comply with the applicable U.S. requirements at any time during the product development process, including non-clinical testing, clinical testing, or the approval process or post-approval process, may subject an applicant to delays in the conduct of a study, regulatory review and approval, and/or administrative or judicial sanctions. These sanctions may include, but are not limited to, the U.S. Food and Drug Administration's (FDA), refusal to allow an applicant to proceed with clinical testing, refusal to approve pending applications, license suspension or revocation, withdrawal of an approval, warning letters, adverse publicity, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, and civil or criminal investigations and penalties brought by the FDA or the Department of Justice (DOJ), or other governmental entities.

An applicant seeking approval to market and distribute a new biologic in the United States generally must satisfactorily complete each of the following steps:

- non-clinical laboratory tests, animal studies, and formulation studies all performed in accordance with the FDA's good laboratory practice (GLP) regulations;
- submission to the FDA of an investigational new drug application (IND) for human clinical testing, which must become effective before human clinical trials may begin;
- approval by an institutional review board (IRB) representing each clinical site before each clinical trial may be initiated;
- performance of adequate and well-controlled human clinical trials to establish the safety, potency, and purity of the product candidate for each proposed indication, in accordance with good clinical practices (GCP);
- preparation and submission to the FDA of a biologic license application (BLA), for a biologic product requesting marketing for one or more proposed indications, including submission of detailed information on the manufacture and composition of the product in clinical development and proposed labeling;
- FDA acceptance and review of the BLA, which might include review by an FDA advisory committee;
- one or more FDA inspections of the manufacturing facility or facilities, including those of third parties, at which the product, or components thereof, are produced to assess compliance with current good manufacturing practices (cGMP) requirements and to assure that the facilities, methods, and controls are adequate to preserve the product's identity, strength, quality, and purity;
- any FDA audits of the non-clinical and clinical trial sites to assure compliance with GLPs and GCPs, respectively, and the integrity of clinical data in support of the BLA;
- payment of user fees and securing FDA approval of the BLA and licensure of the new biologic product; and
- compliance with any post-approval requirements, including the potential requirement to implement a risk evaluation and mitigation strategy (REMS) and any post-approval studies required by the FDA as a condition of approval.

Non-clinical Studies and Investigational New Drug Application

Before testing any biologic product candidate in humans, the product candidate must undergo non-clinical testing. Non-clinical tests include laboratory evaluations of product chemistry, formulation, and stability, as well as animal studies to evaluate the potential for efficacy and toxicity for eventual use in humans. The conduct of

the non-clinical tests and formulation of the compounds for testing must comply with federal regulations and requirements, including GLP requirements. The results of the non-clinical tests, together with manufacturing information, analytical data, any available literature and plans for clinical trials, among other things are submitted to the FDA as part of an IND. The IND automatically becomes effective 30 days after receipt by the FDA, unless before that time the FDA raises concerns or questions about the product or conduct of the proposed clinical trial, including concerns that human research subjects will be exposed to unreasonable health risks. In that case, the IND sponsor and the FDA must resolve any outstanding FDA concerns before the clinical trial can begin.

As a result, submission of the IND may result in the FDA not allowing the trial to commence or allowing the trial to commence on the terms originally specified by the sponsor in the IND. If the FDA raises concerns or questions either during this initial 30-day period, or at any time during the IND process, it may choose to impose a partial or complete clinical hold. This order issued by the FDA would delay either a proposed clinical trial or cause suspension of an ongoing study, until all outstanding concerns have been adequately addressed and the FDA has notified the company that investigation may proceed. This could cause significant delays or difficulties in completing planned clinical trials in a timely manner. The FDA also may impose clinical holds on a biologic product candidate at any time before or during clinical trials due to safety concerns or non-compliance. If the FDA imposes a clinical hold, trials may not recommence without FDA authorization and then only recommence under terms authorized by the FDA.

Human Clinical Trials in Support of a BLA

Clinical trials involve the administration of the investigational product candidate to healthy volunteers or patients with the disease to be treated under the supervision of a qualified principal investigator in accordance with GCP requirements. Clinical trials are conducted under study protocols detailing, among other things, the objectives of the study, inclusion and exclusion criteria, the parameters to be used in monitoring safety, and the effectiveness criteria to be evaluated. A protocol for each clinical trial and any subsequent protocol amendments must be submitted to the FDA as part of the IND.

A sponsor who wishes to conduct a clinical trial outside the United States may, but need not, obtain FDA authorization to conduct the clinical trial under an IND. If a foreign clinical trial is not conducted under an IND, the sponsor may submit data from the clinical trial to the FDA in support of the BLA so long as the clinical trial is well-designed and well-conducted in accordance with GCP, including review and approval by an independent ethics committee, and the FDA is able to validate the study data through an onsite inspection, if necessary.

Further, each clinical trial must be reviewed and approved by an institutional review board (IRB), either centrally or individually at each institution at which the clinical trial will be conducted. The IRB will consider, among other things, clinical trial design, patient informed consent, ethical factors, and the safety of human subjects. An IRB must operate in compliance with FDA regulations. The FDA, IRB, or the clinical trial sponsor, including at the recommendation of a data monitoring committee, if applicable, may suspend or discontinue a clinical trial at any time for various reasons, including a finding that the clinical trial is not being conducted in accordance with FDA requirements or the subjects or patients are being exposed to an unacceptable health risk. Clinical testing also must satisfy extensive GCP rules and the requirements for informed consent. Additionally, some clinical trials are overseen by an independent group of qualified experts organized by the clinical trial sponsor, known as a data safety monitoring board or committee. This group may recommend continuation of the study as planned, changes in study conduct, or cessation of the study at designated check points based on access to certain data from the study.

Clinical trials typically are conducted in three sequential phases, which may overlap or be combined. Additional studies may be required after approval.

- *Phase I* clinical trials are initially conducted in a limited population to test the product candidate for safety, including adverse effects, dose tolerance, absorption, metabolism, distribution, excretion, and pharmacodynamics in healthy humans or, on occasion, in patients with the target disease or condition, such as cancer patients.
- *Phase II* clinical trials are generally conducted in a limited patient population to identify possible adverse effects and safety risks, evaluate the efficacy of the product candidate for specific targeted indications, and determine dose tolerance and optimal dosage. Multiple Phase II clinical trials may be conducted by the sponsor to obtain information prior to beginning larger and more costly Phase III clinical trials.
- *Phase III* clinical trials proceed if the Phase II clinical trials demonstrate that a dose range of the product candidate is potentially effective and has an acceptable safety profile. Phase III clinical trials are undertaken within an expanded patient population to further evaluate dosage, provide substantial evidence of clinical efficacy, and further test for safety in an expanded and diverse patient population generally at multiple, geographically dispersed clinical trial sites. A well-controlled, statistically robust Phase III trial may be designed to deliver the data that regulatory authorities will use to decide whether or not to approve, and, if approved, how to appropriately label a biologic.

In some cases, the FDA may approve a BLA for a product candidate but require the sponsor to conduct additional clinical trials to further assess the product candidate's safety and effectiveness after approval. Such post-approval trials are typically referred to as Phase IV clinical trials. These studies are used to gain additional experience from the treatment of patients in the intended therapeutic indication and to document a clinical benefit in the case of biologics approved under accelerated approval regulations. If the FDA approves a product while a company has ongoing clinical trials that were not necessary for approval, a company may be able to use the data from these clinical trials to meet all or part of any Phase IV clinical trial requirement or to request a change in the product labeling. Failure to exhibit due diligence with regard to conducting Phase IV clinical trials could result in withdrawal of approval for products.

Clinical trials at each phase of development may not be completed successfully within any specified period, or at all.

Review by the RAC was previously required for all gene transfer protocols. In April 2016, the NIH streamlined the review process for human gene transfer protocols subject to the NIH Guidelines. Per the guideline revisions, review is now performed only in exceptional cases that meet specified criteria as outlined in the NIH Guidelines, as determined either by a local regulatory body (e.g., an IBC) and endorsed by the NIH, or as determined solely by NIH.

Compliance with cGMP Requirements

Before approving a BLA, the FDA typically will 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 full compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications. The PHSA emphasizes the importance of manufacturing control for products like biologics whose attributes cannot be precisely defined.

Manufacturers and others involved in the manufacture and distribution of products must also register their establishments with the FDA and certain state agencies. Both domestic and foreign manufacturing establishments must register and provide additional information to the FDA upon their initial participation in the manufacturing process. Any product manufactured by or imported from a facility that has not registered, whether foreign or

domestic, is deemed misbranded under the FDCA. Establishments may be subject to periodic unannounced inspections by government authorities to ensure compliance with cGMPs and other laws. Manufacturers may have to provide, on request, electronic or physical records regarding their establishments. Delaying, denying, limiting, or refusing inspection by the FDA may lead to a product being deemed to be adulterated.

Review and Approval of a BLA

The results of product candidate development, non-clinical testing, and clinical trials, including negative or ambiguous results as well as positive findings, are submitted to the FDA as part of a BLA requesting license to market the product. The BLA must contain extensive manufacturing information and detailed information on the composition of the product and proposed labeling as well as payment of a user fee.

The FDA has 60 days after submission of the application to conduct an initial review to determine whether it is sufficient to accept for filing based on the agency's threshold determination that it is sufficiently complete to permit substantive review. Once the submission has been accepted for filing, the FDA begins an in-depth review of the application. Under the goals and policies agreed to by the FDA under the Prescription Drug User Fee Act VI (PDUFA), the FDA has ten months in which to complete its initial review of a standard application and respond to the applicant, and six months for a priority review of the application. The FDA does not always meet its PDUFA goal dates for standard and priority BLAs. The review process may often be significantly extended by FDA requests for additional information or clarification. The review process and the PDUFA goal date may be extended by three months if the FDA requests or if the applicant otherwise provides additional information or clarification regarding information already provided in the submission within the last three months before the PDUFA goal date.

Under the PHSA, the FDA may approve a BLA if it determines that the product is safe, pure, and potent and the facility where the product will be manufactured meets standards designed to ensure that it continues to be safe, pure, and potent.

On the basis of the FDA's evaluation of the application and accompanying information, including the results of the inspection of the manufacturing facilities and any FDA audits of non-clinical and clinical trial sites to assure compliance with GLPs and GCPs, respectively, the FDA may issue an approval letter, denial letter, or a complete response letter. An approval letter authorizes commercial marketing of the product with specific prescribing information for specific indications. If the application is not approved, the FDA may issue a complete response letter, which will contain the conditions that must be met in order to secure final approval of the application, and when possible will outline recommended actions the sponsor might take to obtain approval of the application. Sponsors that receive a complete response letter may submit to the FDA information that represents a complete response to the issues identified by the FDA. Such resubmissions are classified under PDUFA as either Class 1 or Class 2. The classification of a resubmission is based on the information submitted by an applicant in response to an action letter. Under the goals and policies agreed to by the FDA under PDUFA, the FDA has two months to review a Class 1 resubmission and six months to review a Class 2 resubmission. The FDA will not approve an application until issues identified in the complete response letter have been addressed. The FDA issues a denial letter if it determines that the establishment or product does not meet the agency's requirements.

The FDA may also refer the application to an advisory committee for review, evaluation, and recommendation as to whether the application should be approved. In particular, the FDA may refer applications for novel biologic products or biologic products that present difficult questions of safety or efficacy to an advisory committee. Typically, an advisory committee is a panel of independent experts, including clinicians and other scientific experts, that reviews, evaluates, and provides a recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations carefully when making decisions.

If the FDA approves a new product, it may limit the approved indications for use of the product. It may also require that contraindications, warnings or precautions be included in the product labeling. In addition, the FDA may call for post-approval studies, including Phase IV clinical trials, to further assess the product's safety after approval. The agency may also require testing and surveillance programs to monitor the product after commercialization, or impose other conditions, including distribution restrictions or other risk management mechanisms, including REMS, to help ensure that the benefits of the product outweigh the potential risks. REMS can include medication guides, communication plans for healthcare professionals, and elements to assure safe use (ETASU). ETASU can include, but are not limited to, special training or certification for prescribing or dispensing, dispensing only under certain circumstances, special monitoring, and the use of patent registries. The FDA may prevent or limit further marketing of a product based on the results of post-market studies or surveillance programs. After approval, many types of changes to the approved product, such as adding new indications, manufacturing changes and additional labeling claims, are subject to further testing requirements and FDA review and approval. Such post-approval requirements can be costly and time-consuming and can affect the potential market and profitability of the product.

Fast Track, Breakthrough Therapy, and Priority Review Designations

The FDA is authorized to designate certain products for expedited review if they are intended to address an unmet medical need in the treatment of a serious or life-threatening disease or condition. These programs are referred to as fast track designation, breakthrough therapy designation, and priority review designation.

Specifically, the FDA may designate a product for fast track review if it is intended, whether alone or in combination with one or more other products, for the treatment of a serious or life-threatening disease or condition, and it demonstrates the potential to address unmet medical needs for such a disease or condition. For fast track products, sponsors may have greater interactions with the FDA and the FDA may initiate review of sections of a fast track product's application before the application is complete. This rolling review may be available if the FDA determines, after preliminary evaluation of clinical data submitted by the sponsor, that a fast track product may be effective. The sponsor must also provide, and the FDA must approve, a schedule for the submission of the remaining information and the sponsor must pay applicable user fees. However, the FDA's time period goal for reviewing a fast track application does not begin until the last section of the application is submitted. In addition, the fast track designation may be withdrawn by the FDA if the FDA believes that the designation is no longer supported by data emerging in the clinical trial process.

Second, in 2012, Congress enacted the Food and Drug Administration Safety and Innovation Act (FDASIA). This law established a new regulatory scheme allowing for expedited review of products designated as "breakthrough therapies." A product may be designated as a breakthrough therapy if it is intended, either alone or in combination with one or more other products, to treat a serious or life-threatening disease or condition and preliminary clinical evidence indicates that the product may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. The FDA may take certain actions with respect to breakthrough therapies, including holding meetings with the sponsor throughout the development process; providing timely advice to the product sponsor regarding development and approval; involving more senior staff in the review process; assigning a cross-disciplinary project lead for the review team; and taking other steps to design the clinical trials in an efficient manner.

Third, the FDA may designate a product for priority review if it treats a serious condition and, if approved, would provide a significant improvement in safety or effectiveness. The FDA determines, on a case-by-case basis, whether the proposed product represents a significant improvement when compared with other available therapies. Significant improvement may be illustrated by evidence of increased effectiveness in the treatment of a condition, elimination or substantial reduction of a treatment-limiting product reaction, documented enhancement of patient compliance that may lead to improvement in serious outcomes, and evidence of safety and effectiveness in a new subpopulation. A priority designation is intended to direct overall attention and resources

to the evaluation of such applications, and to shorten the FDA's goal for taking action on a marketing application from ten months to six months.

Accelerated Approval Pathway

The FDA may grant accelerated approval to a product for a serious or life-threatening condition that provides meaningful therapeutic advantage to patients over existing treatments based upon a determination that the product has an effect on a surrogate endpoint that is reasonably likely to predict clinical benefit. The FDA may also grant accelerated approval for such a condition when the product has an effect on an intermediate clinical endpoint that can be measured earlier than an effect on irreversible morbidity or mortality (IMM) and that is reasonably likely to predict an effect on IMM or other clinical benefit, taking into account the severity, rarity, or prevalence of the condition and the availability or lack of alternative treatments. Products granted accelerated approval must meet the same statutory standards for safety and effectiveness as those granted traditional approval, and do not receive either more or less favorable review from the FDA based on such designation.

For the purposes of accelerated approval, a surrogate endpoint is a marker, such as a laboratory measurement, radiographic image, physical sign, or other measure that is thought to predict clinical benefit, but is not itself a measure of clinical benefit. Surrogate endpoints can often be measured more easily or more rapidly than clinical endpoints. An intermediate clinical endpoint is a measurement of a therapeutic effect that is considered reasonably likely to predict the clinical benefit of a product, such as an effect on IMM. The FDA has limited experience with accelerated approvals based on intermediate clinical endpoints, but has indicated that such endpoints generally may support accelerated approval where the therapeutic effect measured by the endpoint is not itself a clinical benefit and basis for traditional approval, if there is a basis for concluding that the therapeutic effect is reasonably likely to predict the ultimate clinical benefit of a product.

The accelerated approval pathway is most often used in settings in which the course of a disease is long and an extended period of time is required to measure the intended clinical benefit of a product, even if the effect on the surrogate or intermediate clinical endpoint occurs rapidly. Thus, accelerated approval has been used extensively in the development and approval of products for treatment of a variety of cancers in which the goal of therapy is generally to improve survival or decrease morbidity and the duration of the typical disease course requires lengthy and sometimes large trials to demonstrate a clinical or survival benefit.

The accelerated approval pathway is usually contingent on a sponsor's agreement to conduct, in a diligent manner, additional post-approval confirmatory studies to verify and describe the product's clinical benefit. As a result, a product candidate approved on this basis is subject to rigorous post-marketing compliance requirements, including the completion of Phase IV or post-approval clinical trials to confirm the effect on the clinical endpoint. Failure to conduct required post-approval studies, or confirm a clinical benefit during post-marketing studies, would allow the FDA to withdraw the product from the market on an expedited basis. All promotional materials for product candidates approved under accelerated regulations are subject to prior review by the FDA.

Accelerated Approval for Regenerative Advanced Therapies

As part of the 21st Century Cures Act, Congress recently amended the FDCA to create an accelerated approval program for regenerative advanced therapies, which include cell therapies, therapeutic tissue engineering products, human cell and tissue products, and combination products using any such therapies or products. Regenerative advanced therapies do not include those human cells, tissues, and cellular and tissue based products regulated solely under section 361 of the Public Health Service Act and 21 CFR Part 1271. The new program is intended to facilitate efficient development and expedite review of regenerative advanced therapies, which are intended to treat, modify, reverse, or cure a serious or life-threatening disease or condition. Products granted accelerated approval as regenerative advanced therapies must meet the same statutory standards for safety and effectiveness as those granted traditional approval, and do not receive either more or less favorable

review from the FDA based on such designation. A drug sponsor may request that FDA designate a drug as a regenerative advanced therapy concurrently with or at any time after submission of an IND as an amendment. FDA has 60 calendar days after receipt of the designation request to determine whether the drug meets the criteria, including whether there is preliminary clinical evidence indicating that the drug has the potential to address unmet medical needs for a serious or life-threatening disease or condition. A new drug application or BLA for a regenerative advanced therapy may be eligible for priority review or accelerated approval through (1) surrogate or intermediate endpoints reasonably likely to predict long-term clinical benefit or (2) reliance upon data obtained from a meaningful number of sites. Benefits of such designation also include early interactions with FDA to discuss any potential surrogate or intermediate endpoint to be used to support accelerated approval. A regenerative advanced therapy that is granted accelerated approval and is subject to postapproval requirements may fulfill such requirements through the submission of clinical evidence, clinical trials, patient registries, or other sources of real world evidence, such as electronic health records; the collection of larger confirmatory data sets; or postapproval monitoring of all patients treated with such therapy prior to its approval.

Post-Approval Regulation

If regulatory approval for marketing of a product or new indication for an existing product is obtained, the sponsor will be required to comply with all regular post-approval regulatory requirements as well as any post-approval requirements that the FDA has imposed as part of the approval process. The sponsor will be required to report certain adverse reactions and production problems to the FDA, provide updated safety and efficacy information comply with requirements concerning advertising and promotional labeling, as well as maintain certain records. 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 prescription drug program fees, as well as new application fees for certain supplemental applications. Manufacturers and certain of 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 ongoing regulatory requirements, including cGMP regulations, which impose certain procedural and documentation requirements upon manufacturers. Changes to the manufacturing process are strictly regulated and often require prior FDA approval before being implemented. Accordingly, the sponsor and its third-party manufacturers must continue to expend time, money, and effort in the areas of production and quality control to maintain compliance with cGMP regulations and other regulatory requirements.

A biologic product may also be subject to official lot release, meaning that the manufacturer is required to perform certain tests on each lot of the product before it is released for distribution. If the product is subject to official lot release, the manufacturer must submit samples of each lot, together with a release protocol showing a summary of the history of manufacture of the lot and the results of all of the manufacturer’s tests performed on the lot, to the FDA. The FDA may in addition perform certain confirmatory tests on lots of some products before releasing the lots for distribution. Finally, the FDA will conduct laboratory research related to the safety, purity, potency, and effectiveness of pharmaceutical products.

Once an approval is granted, the FDA may withdraw the 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 trials to assess new safety risks; or imposition of distribution or other restrictions under a REMS program. Other potential consequences include, among other things:

- restrictions on the marketing or manufacturing of the product, suspension of the approval, complete withdrawal of the product from the market, or product recalls;
- fines, untitled letters or warning letters, or holds on post-approval clinical trials;

- refusal of the FDA to approve pending BLAs or supplements to approved BLAs, or suspension or revocation of product license approvals;
- product seizure or detention, or refusal to permit the import or export of products; or
- injunctions or the imposition of civil or criminal penalties.

The FDA strictly regulates marketing, labeling, advertising, and promotion of products that are placed on the market. Pharmaceutical products may be promoted only for the approved indications 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, and a company that is found to have improperly promoted off-label uses may be subject to significant liability.

Orphan Drug Designation

Orphan drug designation in the United States is designed to encourage sponsors to develop products intended for rare diseases or conditions. In the United States, a rare disease or condition is statutorily defined as a condition that affects fewer than 200,000 individuals in the United States or that affects more than 200,000 individuals in the United States and for which there is no reasonable expectation that the cost of developing and making available the biologic for the disease or condition will be recovered from sales of the product in the United States.

Orphan drug designation qualifies a company for tax credits and market exclusivity for seven years following the date of the product's marketing approval if granted by the FDA. An application for designation as an orphan product can be made any time prior to the filing of an application for approval to market the product. A product becomes an orphan when it receives orphan drug designation from the Office of Orphan Products Development (OOPD) at the FDA based on acceptable confidential requests made under the regulatory provisions. The product must then go through the review and approval process like any other product.

A sponsor may request orphan drug designation of a previously unapproved product or new orphan indication for an already marketed product. In addition, a sponsor of a product that is otherwise the same product as an already approved orphan drug may seek and obtain orphan drug designation for the subsequent product for the same rare disease or condition if it can present a plausible hypothesis that its product may be clinically superior to the first drug. More than one sponsor may receive orphan drug designation for the same product for the same rare disease or condition, but each sponsor seeking orphan drug designation must file a complete request for designation.

The period of exclusivity begins on the date that the marketing application is approved by the FDA and applies only to the indication for which the product has been designated. The FDA may approve a second application for the same product for a different use or a second application for a clinically superior version of the product for the same use. The FDA cannot, however, approve the same product made by another manufacturer for the same indication during the market exclusivity period unless it has the consent of the sponsor or the sponsor is unable to provide sufficient quantities.

Biosimilars and Exclusivity

The Patient Protection and Affordable Care Act, which was signed into law in March 2010, included a subtitle called the Biologics Price Competition and Innovation Act of 2009 (BPCIA). The BPCIA established a regulatory scheme authorizing the FDA to approve biosimilars and interchangeable biosimilars. To date, seven biosimilar products have been approved by the FDA for use in the United States. No interchangeable biosimilars, however, have been approved. The FDA has issued several guidance documents outlining an approach to review and approval of biosimilars. Additional guidances are expected to be finalized by the FDA in the near term.

Under the BPCIA, a manufacturer may submit an application for licensure of a biologic product that is "biosimilar to" or "interchangeable with" a previously approved biological product or "reference product." In order for the FDA to approve a biosimilar product, it must find that the product is "highly similar" to the reference product notwithstanding minor differences in clinically inactive components and that there are no clinically meaningful differences between the reference product and proposed biosimilar product in terms of safety, purity, and potency. For the FDA to approve a biosimilar product as interchangeable with a reference product, the agency must find that the biosimilar product can be expected to produce the same clinical results as the reference product, and, for products administered multiple times, that the biologic and the reference biologic may be switched after one has been previously administered without increasing safety risks or risks of diminished efficacy relative to exclusive use of the reference biologic.

Under the BPCIA, an application for a biosimilar product may not be submitted to the FDA until four years following the date of approval of the reference product. The FDA may not approve a biosimilar product until 12 years from the date on which the reference product was approved. Even if a product is considered to be a reference product eligible for exclusivity, another company could market a competing version of that product if the FDA approves a full BLA for such product containing the sponsor's own non-clinical data and data from adequate and well-controlled clinical trials to demonstrate the safety, purity, and potency of their 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.

Pediatric Studies and Exclusivity

Under the Pediatric Research Equity Act of 2003, a BLA or supplement thereto must contain data that are adequate to assess the safety and effectiveness of the product for the claimed indications in all relevant pediatric subpopulations, and to support dosing and administration for each pediatric subpopulation for which the product is safe and effective. Sponsors must also submit pediatric study plans prior to the assessment data. Those plans must contain an outline of the proposed pediatric study or studies the applicant plans to conduct, including study objectives and design, any deferral or waiver requests, and other information required by regulation. The applicant, the FDA, and the FDA's internal review committee must then review the information submitted, consult with each other, and agree upon a final plan. The FDA or the applicant may request an amendment to the plan at any time.

The FDA may, on its own initiative or at the request of the applicant, grant deferrals for submission of some or all pediatric data until after approval of the product for use in adults, or full or partial waivers from the pediatric data requirements. Additional requirements and procedures relating to deferral requests and requests for extension of deferrals are contained in FDASIA.

Pediatric exclusivity is another type of non-patent marketing exclusivity in the United States and, if granted, provides for the attachment of an additional six months of marketing protection to the term of any existing regulatory exclusivity, including the non-patent exclusivity. This six month exclusivity may be granted if a BLA sponsor submits pediatric data that fairly respond to a written request from the FDA for such data. The data do not need to show the product to be effective in the pediatric population studied; rather, if the clinical trial is deemed to fairly respond to the FDA's request, the additional protection is granted. If reports of requested pediatric studies are submitted to and accepted by the FDA within the statutory time limits, whatever statutory or regulatory periods of exclusivity or patent protection cover the product are extended by six months. This is not a patent term extension, but it effectively extends the regulatory period during which the FDA cannot approve another application.

Patent Term Restoration and Extension

A patent claiming a new biologic product may be eligible for a limited patent term extension under the Drug Price Competition and Patent Term Restoration Act of 1984, referred to as the Hatch-Waxman Amendments,

which permits a patent restoration of up to five years for patent term lost during product development and FDA regulatory review. The restoration period granted on a patent covering a product is typically one-half the time between the effective date of an IND and the submission date of a BLA, plus the time between the submission date of a BLA and the ultimate approval date. Patent term restoration cannot be used to extend the remaining term of a patent past a total of 14 years from the product's approval date. Only one patent applicable to an approved product is eligible for the extension, and the application for the extension must be submitted prior to the expiration of the patent in question. A patent that covers multiple products for which approval is sought can only be extended in connection with one of the approvals. The USPTO reviews and approves the application for any patent term extension or restoration in consultation with the FDA.

Regulation and Procedures Governing Approval of Medicinal Products in the European Union

In order to market any product outside of the United States, a company also must comply with numerous and varying regulatory requirements of other countries and jurisdictions regarding quality, safety and efficacy and governing, among other things, clinical trials, marketing authorization, commercial sales and distribution of products. Whether or not it obtains FDA approval for a product, an applicant will need to obtain the necessary approvals by the comparable foreign regulatory authorities before it can commence clinical trials or marketing of the product in those countries or jurisdictions. Specifically, the process governing approval of medicinal products in the EU, generally follows the same lines as in the United States. It entails satisfactory completion of non-clinical studies and adequate and well-controlled clinical trials to establish the safety and efficacy of the product for each proposed indication. It also requires the submission to the relevant competent authorities of a marketing authorization application (MAA), and granting of a marketing authorization by these authorities before the product can be marketed and sold in the EU.

Clinical Trial Approval

Pursuant to the currently applicable Clinical Trials Directive 2001/20/EC and the Directive 2005/28/EC on GCP, a system for the approval of clinical trials in the EU has been implemented through national legislation of the member states. Under this system, an applicant must obtain approval from the competent national authority of an EU member state in which the clinical trial is to be conducted, or in multiple member states if the clinical trial is to be conducted in a number of member states. Furthermore, the applicant may only start a clinical trial at a specific trial site after the independent ethics committee has issued a favorable opinion. The clinical trial application (CTA) must be accompanied by an investigational medicinal product dossier with supporting information prescribed by Directive 2001/20/EC and Directive 2005/28/EC and corresponding national laws of the member states and further detailed in applicable guidance documents.

In April 2014, the EU adopted a new Clinical Trials Regulation (EU) No 536/2014, which is set to replace the current Clinical Trials Directive 2001/20/EC. It is expected that the new Clinical Trials Regulation (EU) No 536/2014 will apply in 2019 with a three-year transition period. It will overhaul the current system of approvals for clinical trials in the EU. Specifically, the new regulation, which will be directly applicable in all member states, aims at simplifying and streamlining the approval of clinical trials in the EU. For instance, the new Clinical Trials Regulation provides for a streamlined application procedure via a single entry point and strictly defined deadlines for the assessment of clinical trial applications.

Marketing Authorization

To obtain a marketing authorization for a product under the EU regulatory system, an applicant must submit an MAA, either under a centralized procedure administered by the European Medicines Authority (EMA) or one of the procedures administered by competent authorities in EU Member States (decentralized procedure, national procedure, or mutual recognition procedure). A marketing authorization may be granted only to an applicant established in the EU. Regulation (EC) No 1901/2006 provides that prior to obtaining a marketing authorization in the EU, an applicant must demonstrate compliance with all measures included in an EMA-approved Pediatric

Investigation Plan (PIP) covering all subsets of the pediatric population, unless the EMA has granted a product-specific waiver, class waiver, or a deferral for one or more of the measures included in the PIP.

The centralized procedure provides for the grant of a single marketing authorization by the European Commission that is valid for all EU member states. Pursuant to Regulation (EC) No. 726/2004, the centralized procedure is compulsory for specific products, including for medicines produced by certain biotechnological processes, advanced therapy products and products with a new active substance indicated for the treatment of certain diseases, including products for the treatment of cancer. For products with a new active substance indicated for the treatment of other diseases and products that are highly innovative or for which a centralized process is in the interest of patients, the centralized procedure may be optional.

Under the centralized procedure, the Committee for Medicinal Products for Human Use (CHMP) established at the EMA is responsible for conducting an initial assessment of a product. Under the centralized procedure in the European Union, the maximum timeframe for the evaluation of an MAA is 210 days, excluding clock stops when additional information or written or oral explanation is to be provided by the applicant in response to questions of the CHMP. Accelerated evaluation may be granted by the CHMP in exceptional cases, when a medicinal product is of major interest from the point of view of public health and, in particular, from the viewpoint of therapeutic innovation. If the CHMP accepts such a request, the time limit of 210 days will be reduced to 150 days, but it is possible that the CHMP may revert to the standard time limit for the centralized procedure if it determines that it is no longer appropriate to conduct an accelerated assessment.

Regulatory Data Protection in the European Union

In the European Union, new chemical entities approved on the basis of a complete independent data package qualify for eight years of data exclusivity upon marketing authorization and an additional two years of market exclusivity pursuant to Regulation (EC) No 726/2004, as amended, and Directive 2001/83/EC, as amended. Data exclusivity prevents regulatory authorities in the European Union from referencing the innovator's data to assess a generic (abbreviated) application for a period of eight years. During the additional two-year period of market exclusivity, a generic marketing authorization application can be submitted, and the innovator's data may be referenced, but no generic medicinal product can be marketed until the expiration of the market exclusivity. The overall ten-year period will be extended to a maximum of 11 years if, during the first eight years of those ten years, the marketing authorization holder obtains an authorization for one or more new therapeutic indications which, during the scientific evaluation prior to authorization, is held to bring a significant clinical benefit in comparison with existing therapies. Even if a compound is considered to be a new chemical entity so that the innovator gains the prescribed period of data exclusivity, another company may market another version of the product if such company obtained marketing authorization based on an MAA with a complete independent data package of pharmaceutical tests, non-clinical tests and clinical trials.

Periods of Authorization and Renewals

A marketing authorization is valid for five years, in principle, and it may be renewed after five years on the basis of a reevaluation of the risk benefit balance by the EMA or by the competent authority of the authorizing member state. To that end, the marketing authorization holder must provide the EMA or the competent authority with a consolidated version of the file in respect of quality, safety, and efficacy, including all variations introduced since the marketing authorization was granted, at least six months before the marketing authorization ceases to be valid. Once renewed, the marketing authorization is valid for an unlimited period, unless the European Commission or the competent authority decides, on justified grounds relating to pharmacovigilance, to proceed with one additional five-year renewal period. Any authorization that is not followed by the placement of the drug on the EU market (in the case of the centralized procedure) or on the market of the authorizing member state within three years after authorization ceases to be valid.

Regulatory Requirements after Marketing Authorization

Following approval, the holder of the marketing authorization is required to comply with a range of requirements applicable to the manufacturing, marketing, promotion, and sale of the medicinal product. These include compliance with the EU's stringent pharmacovigilance or safety reporting rules, pursuant to which post-authorization studies and additional monitoring obligations can be imposed. In addition, the manufacturing of authorized products, for which a separate manufacturer's license is mandatory, must also be conducted in strict compliance with the EMA's GMP requirements and comparable requirements of other regulatory bodies in the EU, which mandate the methods, facilities, and controls used in manufacturing, processing and packing of drugs to assure their safety and identity. Finally, the marketing and promotion of authorized products, including industry-sponsored continuing medical education and advertising directed toward the prescribers of drugs and/or the general public, are strictly regulated in the European Union under Directive 2001/83EC, as amended.

Coverage, Pricing, and Reimbursement

Significant uncertainty exists as to the coverage and reimbursement status of any product candidates for which we may seek regulatory approval by the FDA or other government authorities. In the United States and markets in other countries, patients who are prescribed treatments for their conditions and providers performing the prescribed services generally rely on third-party payors to reimburse all or part of the associated healthcare costs. Patients are unlikely to use any product candidates we may develop unless coverage is provided and reimbursement is adequate to cover a significant portion of the cost of such product candidates. Even if any product candidates we may develop are approved, sales of such product candidates will depend, in part, on the extent to which third-party payors, including government health programs in the United States such as Medicare and Medicaid, commercial health insurers, and managed care organizations, provide coverage, and establish adequate reimbursement levels for, such product candidates. The process for determining whether a payor will provide coverage for a product may be separate from the process for setting the price or reimbursement rate that the payor will pay for the product once coverage is approved. Third-party payors are increasingly challenging the prices charged, examining the medical necessity, and reviewing the cost-effectiveness of medical products and services and imposing controls to manage costs. Third-party payors may limit coverage to specific products on an approved list, also known as a formulary, which might not include all of the approved products for a particular indication.

In order to secure coverage and reimbursement for any product that might be approved for sale, a company may need to conduct expensive pharmacoeconomic studies in order to demonstrate the medical necessity and cost-effectiveness of the product, in addition to the costs required to obtain FDA or other comparable regulatory approvals. Nonetheless, product candidates may not be considered medically necessary or cost effective. A decision by a third-party payor not to cover any product candidates we may develop could reduce physician utilization of such product candidates once approved and have a material adverse effect on our sales, results of operations, and financial condition. Additionally, 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 and reimbursement for the product, and the level of coverage and reimbursement can differ significantly from payor to payor. Third-party reimbursement and coverage may not be available to enable us to maintain price levels sufficient to realize an appropriate return on our investment in product development.

The containment of healthcare costs also has become a priority of federal, state, and foreign governments and the prices of pharmaceuticals, including biologics, have been a focus in this effort. Governments have shown significant interest in implementing cost-containment programs, including price controls, restrictions on reimbursement, and requirements for substitution of generic products. Adoption of price controls and cost-containment measures, and adoption of more restrictive policies in jurisdictions with existing controls and measures, could further limit a company's revenue generated from the sale of any approved products. Coverage policies and third-party reimbursement rates may change at any time. Even if favorable coverage and

reimbursement status is attained for one or more products for which a company or its collaborators receive regulatory approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

Outside the United States, ensuring adequate coverage and payment for any product candidates we may develop will face challenges. Pricing of prescription pharmaceuticals is subject to governmental control in many countries. Pricing negotiations with governmental authorities can extend well beyond the receipt of regulatory approval for a product and may require us to conduct a clinical trial that compares the cost effectiveness of any product candidates we may develop to other available therapies. The conduct of such a clinical trial could be expensive and result in delays in our commercialization efforts.

In the European Union, pricing and reimbursement schemes vary widely from country to country. Some countries provide that products may be marketed only after a reimbursement price has been agreed. Some countries may require the completion of additional studies that compare the cost effectiveness of a particular product candidate to currently available therapies (so called health technology assessments (HTAs)) in order to obtain reimbursement or pricing approval. For example, the European Union provides options for its member states to restrict the range of products for which their national health insurance systems provide reimbursement and to control the prices of medicinal products for human use. EU member states may approve a specific price for a product or it may instead adopt a system of direct or indirect controls on the profitability of the company placing the product on the market. Other member states allow companies to fix their own prices for products, but monitor and control prescription volumes and issue guidance to physicians to limit prescriptions. Recently, many countries in the EU have increased the amount of discounts required on pharmaceuticals and these efforts could continue as countries attempt to manage healthcare expenditures, especially in light of the severe fiscal and debt crises experienced by many countries in the EU. The downward pressure on healthcare costs in general, particularly prescription products, has become intense. As a result, increasingly high barriers are being erected to the entry of new products. Political, economic, and regulatory developments may further complicate pricing negotiations, and pricing negotiations may continue after reimbursement has been obtained. Reference pricing used by various EU member states, and parallel trade (arbitrage between low-priced and high-priced member states), can further reduce prices. There can be no assurance that any country that has price controls or reimbursement limitations for pharmaceutical products will allow favorable reimbursement and pricing arrangements for any of our products, if approved in those countries.

Healthcare Law and Regulation

Healthcare providers and third-party payors play a primary role in the recommendation and prescription of pharmaceutical products that are granted regulatory approval. Arrangements with providers, consultants, third-party payors, and customers are subject to broadly applicable fraud and abuse, anti-kickback, false claims laws, reporting of payments to physicians and teaching physicians, and patient privacy laws and regulations and other healthcare laws and regulations that may constrain our business and/or financial arrangements. Restrictions under applicable federal and state healthcare laws and regulations include the following:

- the U.S. federal Anti-Kickback Statute, which prohibits, among other things, persons and entities from knowingly and willfully soliciting, offering, paying, receiving, or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made, in whole or in part, under a federal healthcare program such as Medicare and Medicaid;
- the federal civil and criminal false claims laws, including the civil False Claims Act, and civil monetary penalties laws, which prohibit individuals or entities from, among other things: knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false or fraudulent; making a false statement or record material to a false or fraudulent claim or obligation to pay or transmit money or property to the federal government; or knowingly concealing or knowingly and improperly avoiding or decreasing an obligation to pay money to the federal government. In addition, the government may assert that a claim including items and services resulting from a violation

of the federal Anti-Kickback Statute constitutes a false of fraudulent claim for purposes of the False Claims Act;

- the federal Health Insurance Portability and Accountability Act of 1996 (HIPAA) which created additional federal criminal laws that prohibit, among other things, knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program, or making false statements relating to healthcare matters;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, and their respective implementing regulations, including the Final Omnibus Rule published in January 2013, which impose obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security, and transmission of individually identifiable health information;
- the federal transparency requirements known as the federal Physician Payments Sunshine Act, under the Affordable Care Act, which requires certain manufacturers of drugs, devices, biologics and medical supplies to report annually to CMS, information related to payments and other transfers of value made by that entity to physicians and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members; and
- analogous state and foreign laws and regulations, such as state anti-kickback and false claims laws, which may apply to healthcare items or services that are reimbursed by non-governmental third-party payors, including private insurers.

Some state laws require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government in addition to requiring pharmaceutical manufacturers to report information related to payments to physicians and other healthcare providers or marketing expenditures. State and foreign laws also govern 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.

We will be required to spend substantial time and money to ensure that our business arrangements with third parties comply with applicable healthcare laws and regulations. Violations of these laws can subject us to criminal, civil and administrative sanctions including monetary penalties, damages, fines, disgorgement, individual imprisonment, and exclusion from participation in government funded healthcare programs, such as Medicare and Medicaid, 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, and reputational harm, we may be required to curtail or restructure our operations. Moreover, we expect that there will continue to be federal and state laws and regulations, proposed and implemented, that could impact our future operations and business.

Healthcare Reform

A primary trend in the U.S. healthcare industry and elsewhere is cost containment. There have been a number of federal and state proposals during the last few years regarding the pricing of pharmaceutical and biopharmaceutical products, limiting coverage and reimbursement for drugs and other medical products, government control and other changes to the healthcare system in the United States.

By way of example, the United States and state governments continue to propose and pass legislation designed to reduce the cost of healthcare. In March 2010, the United States Congress enacted the ACA, which, among other things, includes changes to the coverage and payment for products under government healthcare programs. Among the provisions of the ACA of importance to our potential product candidates are:

- an annual, nondeductible fee on any entity that manufactures or imports specified branded prescription drugs and biologic products, apportioned among these entities according to their market share in certain government healthcare programs;

- expansion of eligibility criteria for Medicaid programs by, among other things, allowing states to offer Medicaid coverage to certain individuals with income at or below 133% of the federal poverty level, thereby potentially increasing a manufacturer's Medicaid rebate liability;
- expanded manufacturers' rebate liability under the Medicaid Drug Rebate Program by increasing the minimum rebate for both branded and generic drugs and revising the definition of "average manufacturer price" (AMP) for calculating and reporting Medicaid drug rebates on outpatient prescription drug prices and extending rebate liability to prescriptions for individuals enrolled in Medicare Advantage plans;
- addressed a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for products that are inhaled, infused, instilled, implanted or injected;
- expanded the types of entities eligible for the 340B drug discount program;
- established the Medicare Part D coverage gap discount program by requiring manufacturers to provide a 50% point-of-sale-discount off the negotiated price of applicable products to eligible beneficiaries during their coverage gap period as a condition for the manufacturers' outpatient products to be covered under Medicare Part D;
- a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research;
- the Independent Payment Advisory Board (IPAB) which has authority to recommend certain changes to the Medicare program to reduce expenditures by the program that could result in reduced payments for prescription products. The ACA provided that under certain circumstances, IPAB recommendations will become law unless Congress enacts legislation that will achieve the same or greater Medicare cost savings; and
- established the Center for Medicare and Medicaid Innovation within CMS to test innovative payment and service delivery models to lower Medicare and Medicaid spending, potentially including prescription product spending. Funding has been allocated to support the mission of the Center for Medicare and Medicaid Innovation from 2011 to 2019.

Members of the United States Congress and the Trump Administration have expressed an intent to pass legislation or adopt executive orders to fundamentally change or repeal parts of the Affordable Care Act. While Congress has not passed repeal legislation to date, the 2017 Tax Reform Act includes a provision repealing the individual insurance coverage mandate included in the Affordable Care Act, effective January 1, 2019. Further, on January 20, 2017, President Trump signed an Executive Order directing federal agencies with authorities and responsibilities under the ACA to waive, defer, grant exemptions from, or delay the implementation of any provision of the ACA that would impose a fiscal burden on states or a cost, fee, tax, penalty or regulatory burden on individuals, healthcare providers, health insurers, or manufacturers of pharmaceuticals or medical devices. On October 13, 2017, President Trump signed an Executive Order terminating the cost-sharing subsidies that reimburse insurers under the Affordable Care Act. Several state Attorneys General filed suit to stop the administration from terminating the subsidies, but their request for a restraining order was denied by a federal judge in California on October 25, 2017. In addition, CMS has recently proposed regulations that would give states greater flexibility in setting benchmarks for insurers in the individual and small group marketplaces, which may have the effect of relaxing the essential health benefits required under the Affordable Care Act for plans sold through such marketplaces.

It remains to be seen whether there will be further changes to the Affordable Care Act as a result of new legislation or further executive, administrative or judicial action. The impact that any such further action will have on the availability of healthcare and containing or lowering the cost of healthcare including the cost of pharmaceutical and biological products is unclear. The full impact of the Affordable Care Act and the political uncertainty surrounding it on our business also remains unclear.

Other legislative changes have been proposed and adopted in the United States since the ACA was enacted. For example, in August 2011, the Budget Control Act of 2011, among other things, created measures for spending reductions by Congress. A Joint Select Committee on Deficit Reduction, tasked with recommending a targeted deficit reduction of at least $1.2 trillion for the years 2012 through 2021, was unable to reach required goals, thereby triggering the legislation's automatic reduction to several government programs. This includes aggregate reductions of Medicare payments to providers of up to 2% per fiscal year, which went into effect in April 2013 and will remain in effect through 2024 unless additional Congressional action is taken. In January 2013, President Obama signed into law the American Taxpayer Relief Act of 2012, which, among other things, further reduced Medicare payments to several providers, including hospitals, imaging centers, and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years.

There have been, and likely will continue to be, legislative and regulatory proposals at the foreign, federal, and state levels directed at broadening the availability of healthcare and containing or lowering the cost of healthcare. Such reforms could have an adverse effect on anticipated revenues from product candidates that we may successfully develop and for which we may obtain regulatory approval and may affect our overall financial condition and ability to develop product candidates.

Additional Regulation

In addition to the foregoing, state, and federal laws regarding environmental protection and hazardous substances, including the Occupational Safety and Health Act, the Resource Conservation and Recovery Act, and the Toxic Substances Control Act, affect our business. These and other laws govern the use, handling, and disposal of various biologic, chemical, and radioactive substances used in, and wastes generated by, operations. If our operations result in contamination of the environment or expose individuals to hazardous substances, we could be liable for damages and governmental fines. Equivalent laws have been adopted in third countries that impose similar obligations.

Employees

As of January 31, 2018, we had 53 employees, approximately 74% of whom have an M.D., Ph.D., or other advanced degree. All of our employees are in Cambridge, Massachusetts. None of our employees are represented by a labor union or covered under a collective bargaining agreement. We consider our employee relations to be good.

Facilities

Our corporate headquarters are located in Cambridge, Massachusetts, where we lease approximately 33,500 square feet of office and laboratory space pursuant to a lease agreement commencing in July 2015 and expiring in April 2023. This facility houses our research, clinical, regulatory, commercial, and administrative personnel. We believe that our existing facilities are adequate for our near-term needs, but expect to need additional space as we grow. We believe that suitable additional or alternative space would be available as required in the future on commercially reasonable terms.

Legal Proceedings

From time to time, we may be involved in various claims and legal proceedings relating to claims arising out of our operations. Regardless of outcome, litigation can have an adverse impact on us because of defense and settlement costs, diversion of management resources and other factors. We are not currently a party to any legal proceedings.

MANAGEMENT

Executive Officers and Directors

The following table sets forth the name, age, and position of each of our current executive officers and directors as of January 31, 2018:

Name	Age	Position
Charles Wilson, Ph.D.	53	Chief Executive Officer and Director
Seth Ettenberg, Ph.D.	45	Chief Scientific Officer
Christiana Stamoulis	47	President and Chief Financial Officer
Michael Vasconcelles, M.D.	54	Chief Medical Officer
Geoffrey Hodge	53	Chief Technical Officer
Jörn Aldag(1)(3)	58	Director
Bruce Booth, DPhil(3) ..	43	Chairman of the Board, Director
Karen Ferrante, M.D.(2)(3)	60	Director
Robert Perez(1)(2)	53	Director
Liam Ratcliffe, M.D., Ph.D.(1)(2)	54	Director

(1) Member of the audit committee.
(2) Member of the compensation committee.
(3) Member of the nominating and corporate governance committee.

Executive Officers

Charles Wilson, Ph.D. has served as our Chief Executive Officer and Director since March 2014. From 2008 until he joined Unum, Dr. Wilson was Vice President and Global Head of Strategic Alliances at the Novartis Institutes for BioMedical Research. In this role, he was responsible for partnering to support Novartis' research and early development efforts through to clinical proof of concept. Dr. Wilson has held both scientific and business management roles in biotechnology, including as co-founder and Chief Technology Officer of Archemix between 2001 and 2008. Dr. Wilson received a B.A. in Biology and Chemistry and an M.A. in Cell Biology from Boston University and a Ph.D. in Biophysics from the University of California, San Francisco. Dr. Wilson completed his post-doctoral training at Harvard University and Massachusetts General Hospital.

Seth Ettenberg, Ph.D. has served as our Chief Scientific Officer since September 2014. From 2005 until he joined Unum, Dr. Ettenberg served as Head of Novartis Oncology Biotherapeutics, Cambridge Site. Dr. Ettenberg is a cancer biologist and drug development scientist with experience building and leading teams in biotechnology and large pharmaceutical drug discovery settings. Dr. Ettenberg received his Ph.D. from the Uniform Services University of the Health Sciences and completed his post-doctoral training at the National Cancer Institute.

Christiana Stamoulis has served as our President since February 2018 and our Chief Financial Officer since January 2015. From January 2014 until she joined Unum, Ms. Stamoulis was an independent advisor to biopharmaceutical companies. From 2009 until December 2013, Ms. Stamoulis was a Senior Vice President of Corporate Strategy and Business Development at Vertex Pharmaceuticals, Inc. Prior to Vertex, Ms. Stamoulis served as a Managing Director in the Investment Banking division of Citigroup where she led the building of its U.S. Life Sciences investment banking practice. Prior to her role at Citigroup, she was a senior investment banker in the Healthcare group of the Investment Banking division of Goldman, Sachs & Co. where she spent the majority of her investment banking career. Ms. Stamoulis started her career as a strategy consultant at The

Boston Consulting Group. Ms. Stamoulis has been an independent director at Hologic Inc. since November 2011. Ms. Stamoulis holds two undergraduate degrees from the Massachusetts Institute of Technology (MIT) and a Master of Business Administration from the MIT Sloan School of Management.

Michael Vasconcelles, M.D. has served as our Chief Medical Officer since October 2015. From March 2012 until he joined Unum, Dr. Vasconcelles served as the Senior Vice President, Head, Oncology Therapy Area Unit at Takeda Pharmaceuticals, where he was accountable for the oncology research and development strategy and progression of the oncology portfolio from candidate selection through life cycle management and a member of the research and development executive committee. From 2000 until 2012, Dr. Vasconcelles served in several positions at Genzyme Corporation and Sanofi S.A., including Group Vice President and Global Therapeutic Area Head, Transplant and Oncology. In this capacity, he was also a member of the Oncology Business Unit leadership team. Dr. Vasconcelles is a Clinical Instructor in Medicine at Harvard Medical School and a staff physician at the Dana-Farber Cancer Institute and Brigham & Women's Hospital. Dr. Vasconcelles received his B.A. from Northwestern University and his M.D. from Northwestern University's Feinberg School of Medicine.

Geoffrey Hodge has served as our Chief Technical Officer and Senior Vice President of Operations since July 2015. From 2003 and until he joined Unum, Mr. Hodge held several roles at GE Healthcare, the most recent of which was Bioprocess Technology Leader and prior to that Fast Trak Solutions Leader. Prior to GE Healthcare, Mr. Hodge was a co-founder of Xcellerex where he served as its VP of Process Development & Manufacturing. During his tenure at Xcellerex, Mr. Hodge is the inventor of record on multiple technology patents. Mr. Hodge holds a B.A. in Biology from Colgate University and an M.S. in Biotechnology from Worcester Polytechnic Institute.

Non-Employee Directors

Jörn Aldag has served as a member of our board of directors since February 2016. Mr. Aldag has been the Chief Executive Officer at Hookipa Biotech AG since June 2016. Mr. Aldag served as the Chief Executive Officer at uniQure N.V. (formerly, Amsterdam Molecular Therapeutics N.V.) from October 2009 to December 2015 and as an advisor to the board of uniQure N.V. from January 2016 to May 2016. Prior to his tenure at uniQure N.V., Mr. Aldag was President and Chief Executive Officer of Evotec AG from November 1997 to December 2008. Mr. Aldag also serves as the Chairman of Molecular Partners AG, Zurich, Switzerland (SWIX:MOLN) since 2007. He co-founded G7 Therapeutics AG in 2014, which was acquired by Heptares Therapeutics Ltd. in 2016. Mr. Aldag received business degrees from the Harvard Business School (Advanced Management Program) in 1994 and from the European Business School (Diplom Betriebswirt) in 1982. Mr. Aldag's qualifications to sit on our board of directors include his extensive leadership, executive, managerial and business experience with life sciences companies.

Bruce Booth, DPhil. has served as Chairman of our board of directors since February 2018 and as a member of our board of directors since October 2014. Dr. Booth joined Atlas Venture in 2005, and currently serves as a partner of Atlas Venture. Previously, from 2004 to 2005, Dr. Booth was a principal at Caxton Health Holdings L.L.C., a healthcare-focused investment firm, where he focused on the firm's venture capital activities. Dr. Booth serves on the board of several public and privately held companies, including Miragen Therapeutics, Inc. (Nasdaq: MGEN) and Zafgen, Inc. (Nasdaq: ZFGN), among others. Dr. Booth holds a DPhil. in molecular immunology from Oxford University's Nuffield Department of Medicine and a B.S. in biochemistry from Pennsylvania State University. Dr. Booth's qualifications to sit on our board of directors include his extensive leadership, executive, managerial and business experience with life sciences companies, including experience in the formation, development, and business strategy of multiple start-up companies in the life sciences sector.

Robert J. Perez has served as a member of our board of directors since February 2018. Mr. Perez is the managing partner of Vineyard Sound Advisors, a biopharmaceutical advisory firm. Mr. Perez is the former Chief Executive Officer of Cubist Pharmaceuticals, Inc., a public pharmaceutical development company, which was acquired by Merck & Company, Inc. in January 2015. Mr. Perez joined Cubist in August 2003 as Senior Vice

President, Sales and Marketing. He served as Executive Vice President and Chief Operating Officer from August 2007 to July 2012 and President and Chief Operating Officer from July 2012 to December 2014. Prior to joining Cubist, he served as Vice President of Biogen, Inc.'s CNS business unit. Mr. Perez currently serves as a member of the board of directors of AMAG Pharmaceuticals, Inc. (Nasdaq: AMAG), Cidara Therapeutics, Inc. (Nasdaq: CDTX), Spark Therapeutics, Inc. (Nasdaq: ONCE), and Zafgen, Inc. (Nasdaq: ZFGN), as well as a director on the boards of certain private companies, including Vir Biotechnology, Inc. and Akili Interactive Labs, Inc. He also served as a member of the board of directors of Cubist from April 2014 until January 2015 and as a member of the board of directors of Flex Pharma, Inc. (Nasdaq: FLKS), a public biopharmaceutical company, from 2015 to January 2018. Mr. Perez is the Founder and Chairman of Life Science Cares and has been a member of the Board of Trustees at The Dana Farber Cancer Institute, Inc. since January 2013. Mr. Perez received a B.S. in business from California State University, Los Angeles and an M.B.A. from the Anderson Graduate School of Management at the University of California, Los Angeles. Our board of directors believes that Mr. Perez's experience as an executive in the pharmaceutical industry and his experience and expertise serving as a member of the board of directors of several biotechnology companies provide him with the qualifications and skills to serve on our board of directors.

Karen Ferrante, M.D. has served as a member of our board of directors since February 2018. Dr. Ferrante is the former Chief Medical Officer and Head of Research and Development of Tokai Pharmaceuticals, Inc., a publicly traded biopharmaceutical company, where she developed treatments for prostate cancer and other hormonally driven diseases between April 2014 and August 2016. From 2007 to July 2013, Dr. Ferrante held senior positions at Millennium Pharmaceuticals, Inc. and its parent company, Takeda Pharmaceutical Company Limited, including Chief Medical Officer and most recently as Oncology Therapeutic Area Head and Cambridge USA Site Head from May 2013 to July 2013. Dr. Ferrante previously held positions of increasing responsibility at Pfizer Global Research and Development and Bristol-Myers Squibb. Dr. Ferrante serves on the board of directors of Progenics Pharmaceuticals, Inc. (Nasdaq: PGNX), MacroGenics, Inc. (Nasdaq: MGNX), and Hutchinson China MediTech Limited (Nasdaq: HDM). Dr. Ferrante also served as a director of Baxalta Inc., a publicly traded global biopharmaceutical company from July 2015 until its acquisition by Shire Pharmaceuticals in June 2016. She holds an M.D. from Georgetown University and a B.S. in chemistry and biology from Providence College. Dr. Ferrante's qualifications to sit on our board of directors includes her extensive leadership, scientific, business, and managerial experience in the biotechnology industry and her experience and expertise serving as a member of the board of directors of several biotechnology companies.

Liam Ratcliffe, M.D., Ph.D. has served as a member of our board of directors since June 2015. Dr. Ratcliffe is a Managing Director at New Leaf Venture Partners where he is focused on biopharmaceutical investing. Dr. Ratcliffe joined New Leaf in September 2008. Dr. Ratcliffe was previously Senior Vice President and Development Head for Pfizer Neuroscience, as well as Worldwide Head of Clinical Research and Development at Pfizer. Dr. Ratcliffe received his M.D. degree and Ph.D. degree in immunology from the University of Cape Town and his M.B.A. degree from the University of Michigan. Dr. Ratcliffe serves on the board of public companies, including Edge Therapeutics, Inc. (Nasdaq: EDGE) and Deciphera Pharmaceuticals, Inc. (Nasdaq: DCPH). He previously served on the board of Array Biopharmaceuticals, Inc. (Nasdaq: ARRY) (2012-2014). Dr. Ratcliffe's qualifications to sit on our board of directors include his experience as an executive in the biopharmaceutical industry and as an investor in life sciences companies along with his medical training and executive skills.

Composition of Our Board of Directors

Our board of directors currently consists of six members, each of whom are members pursuant to the board composition provisions of our certificate of incorporation and agreements with our stockholders, which agreements are described under "Certain Relationships and Related Party Transactions." These board composition provisions will terminate upon the closing of this offering. Upon the termination of these provisions, there will be no further contractual obligations regarding the election of our directors. Our nominating and corporate governance committee and our board of directors may therefore consider a broad range of factors

relating to the qualifications and background of nominees, which may include diversity, which is not only limited to race, gender, or national origin. We have no formal policy regarding board diversity. Our nominating and corporate governance committee's and our board of directors' priority in selecting board members is identification of persons who will further the interests of our stockholders through his or her established record of professional accomplishment, the ability to contribute positively to the collaborative culture among board members, knowledge of our business, understanding of the competitive landscape, and professional and personal experiences and expertise relevant to our growth strategy. Our directors hold office until their successors have been elected and qualified or until the earlier of their resignation or removal. Our amended and restated certificate of incorporation and amended and restated bylaws that will become effective upon the closing of this offering also provide that our directors may be removed only for cause by the affirmative vote of the holders of at least 66.67% of the votes that all our stockholders would be entitled to cast in an annual election of directors, and that any vacancy on our board of directors, including a vacancy resulting from an enlargement of our board of directors, may be filled only by vote of a majority of our directors then in office.

Director Independence

In February 2018, our board of directors undertook a review of the composition of our board of directors and its committees and the independence of each director. Applicable Nasdaq rules require a majority of a listed company's board of directors to be comprised of independent directors within one year of listing. Based upon information requested from and provided by each director concerning his or her background, employment, and affiliations, including family relationships, our board of directors has determined that all directors other than Dr. Wilson are "independent directors" as defined under applicable Nasdaq rules. In making such determination, our board of directors considered the relationships that each such non-employee director has with our company and all other facts and circumstances that our board of directors deemed relevant in determining his or her independence, including the beneficial ownership of our capital stock by each non-employee director.

There are no family relationships among any of our directors or executive officers.

Staggered Board

In accordance with the terms of our amended and restated certificate of incorporation and amended and restated bylaws that will become effective upon the closing of this offering, our board of directors will be divided into three staggered classes of directors and each will be assigned to one of the three classes. At each annual meeting of the stockholders, a class of directors will be elected for a three-year term to succeed the directors of the same class whose terms are then expiring. The terms of the directors will expire upon the election and qualification of successor directors at the annual meeting of stockholders to be held during the years 2019 for Class I directors, 2020 for Class II directors and 2021 for Class III directors.

- Our Class I directors will be Liam Ratcliffe and Robert Perez;
- Our Class II directors will be Bruce Booth and Karen Ferrante; and
- Our Class III directors will be Jörn Aldag and Charles Wilson.

Our amended and restated certificate of incorporation and amended and restated bylaws that will become effective upon the closing of this offering provide that the number of our directors shall be fixed from time to time by a resolution of the majority of our board of directors.

The division of our board of directors into three classes with staggered three-year terms may delay or prevent stockholder efforts to effect a change of our management or a change in control. We expect that additional directorships resulting from an increase in the number of directors, if any, will be distributed among the three classes so that, as nearly as possible, each class shall consist of one third of the board of directors.

Board Leadership Structure and the Role of the Board in Risk Oversight

Board Leadership Structure

The positions of our chairperson of the board and chief executive officer are separated, with Dr. Wilson serving as our chief executive officer and Dr. Booth serving as the chairperson of our board of directors. Separating these positions allows Dr. Wilson, as our chief executive officer, to focus on our day-to-day business, while allowing the chairperson of the board to lead the board of directors in its fundamental role of providing advice to and independent oversight of management. Our board of directors recognizes the time, effort, and energy that Dr. Wilson, as our chief executive officer, must devote to his position in the current business environment, as well as the commitment required to serve as our chairperson, particularly as the board of directors' oversight responsibilities continue to grow. Our board of directors also believes that this structure ensures a greater role for the independent directors in the oversight of our company and active participation of the independent directors in setting agendas and establishing priorities and procedures for the work of our board of directors. Our board of directors believes its administration of its risk oversight function has not affected its leadership structure. Although our amended and restated bylaws that will become effective upon the closing of this offering will not require our chairperson and chief executive officer positions to be separate, our board of directors believes that having separate positions is the appropriate leadership structure for us at this time and demonstrates our commitment to good corporate governance.

Role of the Board in Risk Oversight

Risk is inherent with every business, and how well a business manages risk can ultimately determine its success. We face a number of risks, including those described under the section titled "Risk Factors" in this prospectus. Our board of directors is actively involved in oversight of risks that could affect us. This oversight is conducted primarily by our full board of directors, which has responsibility for general oversight of risks.

Following the closing of this offering, our board of directors will satisfy this responsibility through full reports by each committee chair regarding the committee's considerations and actions, as well as through regular reports directly from officers responsible for oversight of particular risks within our company. Our board of directors believes that full and open communication between management and the board of directors is essential for effective risk management and oversight.

Committees of Our Board of Directors

Our board of directors has established an audit committee, a compensation committee, and a nominating and corporate governance committee, each of which will operate pursuant to a charter to be adopted by our board of directors and will be effective upon the effectiveness of the registration statement of which this prospectus is a part. Upon the effectiveness of the registration statement of which this prospectus is a part, the composition and functioning of all of our committees will comply with all applicable requirements of the Sarbanes-Oxley Act of 2002, Nasdaq and SEC rules and regulations.

Audit Committee

Jörn Aldag, Liam Ratcliffe, and Robert Perez will serve on the audit committee, which will be chaired by Jörn Aldag. Our board of directors has determined that Liam Ratcliffe and Jörn Aldag are "independent" for audit committee purposes as that term is defined in the rules of the SEC and the applicable Nasdaq rules, and each has sufficient knowledge in financial and auditing matters to serve on the audit committee. Our board of directors has designated Jörn Aldag as an "audit committee financial expert," as defined under the applicable rules of the SEC. The audit committee's responsibilities upon closing of this offering include:

- appointing, approving the compensation of, and assessing the independence of our independent registered public accounting firm;

- pre-approving auditing and permissible non-audit services, and the terms of such services, to be provided by our independent registered public accounting firm;
- reviewing the overall audit plan with our independent registered public accounting firm and members of management responsible for preparing our financial statements;
- reviewing and discussing with management and our independent registered public accounting firm our annual and quarterly financial statements and related disclosures as well as critical accounting policies and practices used by us;
- coordinating the oversight and reviewing the adequacy of our internal control over financial reporting;
- establishing policies and procedures for the receipt and retention of accounting-related complaints and concerns;
- recommending based upon the audit committee's review and discussions with management and our independent registered public accounting firm whether our audited financial statements shall be included in our Annual Report on Form 10-K;
- monitoring the integrity of our financial statements and our compliance with legal and regulatory requirements as they relate to our financial statements and accounting matters;
- preparing the audit committee report required by SEC rules to be included in our annual proxy statement;
- reviewing all related person transactions for potential conflict of interest situations and approving all such transactions; and
- reviewing quarterly earnings releases.

Compensation Committee

Robert Perez, Liam Ratcliffe, and Karen Ferrante will serve on the compensation committee, which will be chaired by Liam Ratcliffe. Our board of directors has determined that each member of the compensation committee is "independent" as defined in the applicable Nasdaq rules. The compensation committee's responsibilities upon closing of this offering include:

- annually reviewing and approving corporate goals and objectives relevant to the compensation of our chief executive officer;
- evaluating the performance of our chief executive officer in light of such corporate goals and objectives and determining the compensation of our chief executive officer;
- reviewing and approving the compensation of our other executive officers;
- reviewing and establishing our overall management compensation, philosophy, and policy;
- overseeing and administering our compensation and similar plans;
- evaluating and assessing potential and current compensation advisors in accordance with the independence standards identified in the applicable Nasdaq rules;
- retaining and approving the compensation of any compensation advisors;
- reviewing and approving our policies and procedures for the grant of equity-based awards;
- evaluating director compensation and making recommendations on director compensation to the Board;
- preparing the compensation committee report required by SEC rules, if and when required, to be included in our annual proxy statement; and
- reviewing and approving the retention or termination of any consulting firm or outside advisor to assist in the evaluation of compensation matters.

Nominating and Corporate Governance Committee

Jörn Aldag, Karen Ferrante, and Bruce Booth will serve on the nominating and corporate governance committee, which will be chaired by Bruce Booth. Our board of directors has determined that each member of the nominating and corporate governance committee is "independent" as defined in the applicable Nasdaq rules. The nominating and corporate governance committee's responsibilities upon closing of this offering include:

- developing and recommending to the board of directors criteria for board and committee membership;
- establishing procedures for identifying and evaluating board of director candidates, including nominees recommended by stockholders;
- reviewing the size and composition of the board of directors to ensure that it is composed of members containing the appropriate skills and expertise to advise us;
- identifying individuals qualified to become members of the board of directors;
- recommending to the board of directors the persons to be nominated for election as directors and to each of the board's committees;
- developing and recommending to the board of directors a code of business conduct and ethics and a set of corporate governance guidelines; and
- overseeing the evaluation of our board of directors and management.

Our board of directors may from time to time establish other committees.

Compensation Committee Interlocks and Insider Participation

None of the members of our compensation committee has at any time during the prior three years been one of our officers or employees. None of our executive officers currently serves, or in the past fiscal year has served, as a member of the board of directors or compensation committee of any entity that has one or more executive officers serving on our board of directors or compensation committee. For a description of transactions between us and members of our compensation committee and affiliates of such members, please see "Certain Relationships and Related Person Transactions."

Code of Business Conduct and Ethics

We plan to adopt a code of business conduct and ethics that applies to all of our employees, officers, and directors, including those officers responsible for financial reporting, which will be effective upon closing of this offering. Upon the closing of this offering, our code of business conduct and ethics will be available on the Corporate Governance section of our website at www.unumrx.com. We intend to disclose any amendments to the code, or any waivers of its requirements, on our website or in a Current Report on Form 8-K as may be required by SEC or Nasdaq rules.

EXECUTIVE COMPENSATION

Overview

As an emerging growth company, we have opted to comply with the executive compensation disclosure rules applicable to "smaller reporting companies," as such term is defined in the rules promulgated under the Securities Act.

This section provides an overview of the compensation awarded to, earned by, or paid to our principal executive officer and our next two most highly compensated executive officers in respect of their service to us for our fiscal year ended December 31, 2017. We refer to these individuals as our named executive officers. Our named executive officers are:

- Charles Wilson, Ph.D., our Chief Executive Officer;
- Michael Vasconcelles, M.D., our Chief Medical Officer; and
- Christiana Stamoulis, our President and Chief Financial Officer.

This section contains certain forward-looking statements that are based on our current intentions and expectations regarding compensatory plans or arrangements we may adopt in the future. Actual plans or arrangements that we adopt following the closing of this offering may be materially different from those described in this section.

Our executive compensation program is based on a pay for performance philosophy. Compensation for our executive officers is composed primarily of the following components: base salary, cash bonus, and long-term equity incentives. Our executive officers, like all full-time employees, are eligible to participate in our retirement and health and welfare benefit plans.

2017 Summary Compensation Table

The following table presents information regarding the total compensation awarded to, earned by, and paid to our named executive officers for services rendered to us in all capacities for the year ended December 31, 2017.

Name and Principal Position	Salary ($)	Bonus ($)	Option Awards ($)(1)	All Other Compensation ($)	Total ($)
Charles Wilson, Ph.D. *Chief Executive Officer*	360,000	113,400	—	—	473,400
Michael Vasconcelles, M.D. *Chief Medical Officer*	384,844	121,669	473,507	—	980,020
Christiana Stamoulis *President and Chief Financial Officer*	348,750	132,300	473,507	—	954,557

(1) Amounts reflect the grant-date fair value of option awards granted in 2017 in accordance with ASC Topic 718. Such grant-date fair value does not take into account any estimated forfeitures related to service-vesting conditions. For information regarding assumptions underlying the valuation of equity awards, see Note 10 to our consolidated financial statements. These amounts do not correspond to the actual value that may be recognized by the executives upon exercise of the options.

Narrative Disclosure to Summary Compensation Table

Base Salary. Each named executive officer's base salary is a fixed component of annual compensation for performing specific duties and functions, and has been established by our board of directors taking into account each individual's role, responsibilities, skills, and experience.

Cash Bonus. Our annual bonus program is intended to reward our named executive officers for meeting objective or subjective performance goals for a fiscal year.

Long-Term Equity Incentives. Our equity grant program is intended to align the interests of our named executive officers with those of our stockholders and to motivate them to make important contributions to our performance.

Employment Arrangements with our Named Executive Officers

Charles Wilson, Ph.D. For the year ended December 31, 2017, the annual base salary for Dr. Wilson was $360,000. For 2017, Dr. Wilson was eligible to earn an annual cash incentive bonus targeted at 30% of his base salary. Upon the effectiveness of the registration statement of which this prospectus is a part, we anticipate entering into an employment agreement with Dr. Wilson. Dr. Wilson's base salary will be $528,000 upon effectiveness of the employment agreement, which is subject to annual review and adjustment, and he will be eligible to earn an annual cash incentive bonus with a target amount equal to 50% of his base salary.

Dr. Wilson's employment agreement will provide that, in the event that Dr. Wilson's employment is terminated by us without "cause" or Dr. Wilson resigns for "good reason" (as each are defined in the employment agreement), subject to the execution and effectiveness of a separation agreement, including a general release of claims in our favor, he will be entitled to receive (i) an amount equal to 12 months of base salary, payable in lump sum within 60 days after the date of termination, (ii) if Dr. Wilson is participating in our group health plan immediately prior to his termination and elects COBRA health continuation, a monthly cash payment until the earlier of 12 months following termination or the end of Dr. Wilson's COBRA health continuation period in an amount equal to the amount that we would have made to provide health insurance to Dr. Wilson had he remained employed with us, and (iii) acceleration of time-based equity awards in an amount that would have vested if he had remained employed for an additional 12 months following the date of his termination. The employment agreement is also expected to provide that, in lieu of the payments and benefits described above, in the event that Dr. Wilson's employment is terminated by us without cause or Dr. Wilson resigns for good reason, in either case within 12 months following a "change in control" (as defined in the employment agreement), subject to the execution and effectiveness of a separation agreement, including a general release of claims in our favor, he will be entitled to receive (i) a lump sum cash payment equal to 18 months of his then-current base salary (or his base salary in effect immediately prior to the change in control, if higher) plus 150 percent of his target bonus, (ii) if Dr. Wilson is participating in our group health plan immediately prior to his termination, a monthly cash payment until the earlier of 18 months following termination or the end of Dr. Wilson's COBRA health continuation period in an amount equal to the amount that we would have made to provide health insurance to him had he remained employed with us and (iii) full acceleration of all time-based equity awards held by Dr. Wilson.

Dr. Wilson is also eligible to participate in the employee benefit plans available to our employees, subject to the terms of those plans.

Michael Vasconcelles, M.D. Effective February 27, 2017, Dr. Vasconcelles' employment arrangement was subject to a company-wide raise which increased his base salary to $386,250. Prior to this adjustment, the annual base salary for Dr. Vasconcelles was $375,000. For 2017, Dr. Vasconcelles was eligible to earn an annual cash incentive bonus targeted at 30% of his base salary. Upon the effectiveness of the registration statement of which this prospectus is a part, we anticipate entering into an employment agreement with Dr. Vasconcelles.

Dr. Vasconcelles' base salary will be $425,000 upon effectiveness of the employment agreement, which is subject to annual review and adjustment, and he will be eligible to earn an annual cash incentive bonus with a target amount equal to 35% of his base salary.

Dr. Vasconcelles' employment agreement will provide that, in the event that Dr. Vasconcelles' employment is terminated by us without "cause" or Dr. Vasconcelles resigns for "good reason" (as each are defined in the employment agreement), subject to the execution and effectiveness of a separation agreement, including a general release of claims in our favor, he will be entitled to receive (i) an amount equal to 9 months of base salary, payable in lump sum within 60 days after the date of termination, (ii) if Dr. Vasconcelles is participating in our group health plan immediately prior to his termination and elects COBRA health continuation, a monthly cash payment until the earlier of 9 months following termination or the end of Dr. Vasconcelles' COBRA health continuation period in an amount equal to the amount that we would have made to provide health insurance to Dr. Vasconcelles had he remained employed with us, and (iii) acceleration of time-based equity awards in an amount that would have vested if he had remained employed for an additional 9 months following the date of his termination. The employment agreement is also expected to provide that, in lieu of the payments and benefits described above, in the event that Dr. Vasconcelles' employment is terminated by us without cause or Dr. Vasconcelles resigns for good reason, in either case within 12 months following a "change in control" (as defined in the employment agreement), subject to the execution and effectiveness of a separation agreement, including a general release of claims in our favor, he will be entitled to receive (i) a lump sum cash payment equal to 12 months of his then-current base salary (or his base salary in effect immediately prior to the change in control, if higher) plus 100 percent of his target bonus, (ii) if Dr. Vasconcelles is participating in our group health plan immediately prior to his termination, a monthly cash payment until the earlier of 12 months following termination or the end of Dr. Vasconcelles' COBRA health continuation period in an amount equal to the amount that we would have made to provide health insurance to him had he remained employed with us and (iii) full acceleration of all time-based equity awards held by Dr. Vasconcelles.

Dr. Vasconcelles is also eligible to participate in the employee benefit plans available to our employees, subject to the terms of those plans.

Christiana Stamoulis. Effective February 15, 2017, Ms. Stamoulis' employment arrangement was amended to increase her base salary to $360,000 and to increase her eligible annual cash incentive bonus to a target of 35% of her base salary. Prior to this amendment, the annual base salary for Ms. Stamoulis was $270,000 and she was eligible to earn an annual cash incentive bonus targeted at 25% of her base salary. Upon the effectiveness of the registration statement of which this prospectus is a part, we anticipate entering into an employment agreement with Ms. Stamoulis. Ms. Stamoulis' base salary will be $425,000 upon effectiveness of the employment agreement, which is subject to annual review and adjustment, and she will be eligible to earn an annual cash incentive bonus with a target amount equal to 35% of her base salary.

Ms. Stamoulis' employment agreement will provide that, in the event that Ms. Stamoulis' employment is terminated by us without "cause" or Ms. Stamoulis resigns for "good reason" (as each are defined in the employment agreement), subject to the execution and effectiveness of a separation agreement, including a general release of claims in our favor, she will be entitled to receive (i) an amount equal to 9 months of base salary, payable in lump sum within 60 days after the date of termination, (ii) if Ms. Stamoulis is participating in our group health plan immediately prior to her termination and elects COBRA health continuation, a monthly cash payment until the earlier of 9 months following termination or the end of Ms. Stamoulis' COBRA health continuation period in an amount equal to the amount that we would have made to provide health insurance to Ms. Stamoulis had she remained employed with us, and (iii) acceleration of time-based equity awards in an amount that would have vested if she had remained employed for an additional 9 months following the date of her termination. The employment agreement is also expected to provide that, in lieu of the payments and benefits described above, in the event that Ms. Stamoulis' employment is terminated by us without cause or Ms. Stamoulis resigns for good reason, in either case within 12 months following a "change in control" (as defined in the employment agreement), subject to the execution and effectiveness of a separation agreement,

including a general release of claims in our favor, she will be entitled to receive (i) a lump sum cash payment equal to 12 months of her then-current base salary (or her base salary in effect immediately prior to the change in control, if higher) plus 100 percent of her target bonus, (ii) if Ms. Stamoulis is participating in our group health plan immediately prior to her termination, a monthly cash payment until the earlier of 12 months following termination or the end of Ms. Stamoulis' COBRA health continuation period in an amount equal to the amount that we would have made to provide health insurance to her had she remained employed with us and (iii) full acceleration of all time-based equity awards held by Ms. Stamoulis.

Ms. Stamoulis is also eligible to participate in the employee benefit plans available to our employees, subject to the terms of those plans.

Other Agreements

Each of our named executive officers has entered into a standard form agreement with respect to confidential information and assignment of inventions. Among other things, this agreement obligates each named executive officer to refrain from disclosing any of our proprietary information received during the course of employment and to assign to us certain inventions conceived or developed during the course of employment. Such agreement also provides that during the period of the named executive officer's employment and for one year thereafter, the named executive officer will not compete with us and will not solicit certain of our employees, consultants, customers, or suppliers.

Outstanding Equity Awards at 2017 Fiscal Year-End

The following table sets forth information concerning outstanding equity awards held by each of our named executive officers as of December 31, 2017.

Name	Grant Date	Number of Securities Underlying Unexercised Options (#) Exercisable	Number of Securities Underlying Unexercised Options (#) Unexercisable	Option Exercise Price ($)	Option Expiration Date
Charles Wilson, Ph.D.	—	—	—	—	—
Michael Vasconcelles, M.D.	11/4/2015	149,374	126,398(1)	5.23	11/3/2025
	10/27/2017	—	79,611(2)	9.77	10/26/2027
Christiana Stamoulis	1/29/2015	290,251	107,804(3)	0.18	1/28/2025
	4/30/2015	102,168	51,087(4)	0.18	4/29/2025
	10/27/2017	—	79,611(5)	9.77	10/26/2027

(1) Dr. Vasconcelles' stock option granted on November 4, 2015 vests over four years, with 25% of the shares vesting on the first anniversary of the vesting commencement date, October 20, 2015, and the remaining shares vesting in 36 equal monthly installments thereafter, subject to Dr. Vasconcelles' continuous service with us.

(2) Dr. Vasconcelles' stock option granted on October 27, 2017 vests over four years, with 25% of the shares vesting on the first anniversary of the vesting commencement date, October 27, 2017, and the remaining shares vesting in 36 equal monthly installments thereafter, subject to Dr. Vasconcelles' continuous service with us.

(3) Ms. Stamoulis' stock option granted on January 29, 2015 vests over four years, with 25% of the shares vesting on the first anniversary of the vesting commencement date, January 9, 2015, and the remaining shares vesting in 36 equal monthly installments thereafter, subject to Ms. Stamoulis' continuous service with us.

(4) Ms. Stamoulis' stock option granted on April 30, 2015 vests over four years, with 25% of the shares vesting on the first anniversary of the vesting commencement date, April 30, 2015, and the remaining shares vesting in 36 equal monthly installments thereafter, subject to Ms. Stamoulis' continuous service with us.

(5) Ms. Stamoulis' stock option granted on October 27, 2017 vests over four years, with 25% of the shares vesting on the first anniversary of the vesting commencement date, October 27, 2017, and the remaining shares vesting in 36 equal monthly installments thereafter, subject to Ms. Stamoulis' continuous service with us.

Compensation Risk Assessment

We believe that although a portion of the compensation provided to our executive officers and other employees is performance-based, our executive compensation program does not encourage excessive or unnecessary risk taking. This is primarily due to the fact that our compensation programs are designed to encourage our executive officers and other employees to remain focused on both short-term and long-term strategic goals, in particular, in connection with our pay-for-performance compensation philosophy. As a result, we do not believe that our compensation programs are reasonably likely to have a material adverse effect on us.

Employee Benefit and Equity Compensation Plans

2018 Stock Option and Incentive Plan

Our 2018 Stock Option and Incentive Plan (2018 Plan) was adopted by our board of directors on February 9, 2018 and approved by our stockholders on March 16, 2018 and became effective upon the date immediately preceding the date of the effectiveness of the registration statement of which this prospectus is a part. The 2018 Plan allows the board of directors' compensation committee to make equity-based incentive awards to our officers, employees, directors, and other key persons (including consultants).

We have initially reserved 2,547,558 shares of our common stock for the issuance of awards under the 2018 Plan, plus the shares of common stock remaining available for issuance under our 2015 Stock Incentive Plan (Initial Limit), which shall be cumulatively increased on January 1, 2019 and each January 1 thereafter by 4% of the number of shares of our common stock and outstanding on the immediately preceding December 31 or a lesser number of shares determined by our board of directors (Annual Increase). These limits are subject to adjustment in the event of a stock split, stock dividend, or other change in our capitalization.

We have granted options to purchase an aggregate of 777,071 shares of our common stock, with an exercise price per share equal to the initial public offering price in this offering, to certain of our employees and non-employee directors in connection with this offering.

The shares we issue under the 2018 Plan will be authorized but unissued shares or shares underlying any awards that are forfeited, cancelled, held back upon exercise or settlement of an award to satisfy the exercise price or tax withholding, reacquired by us prior to vesting, satisfied without the issuance of stock, expire, or are otherwise terminated (other than by exercise) under the 2018 Plan or the 2015 Stock Incentive Plan.

The maximum number of shares that may be issued as incentive stock options may not exceed the Initial Limit, as cumulatively increased on January 1, 2019 and each January 1 thereafter by the lesser of the Annual Increase or 800,000. The value of all awards made under the 2018 Plan and all other cash compensation paid by us to any non-employee director in any calendar year shall not exceed $1,000,000.

The 2018 Plan will be administered by our compensation committee. Our compensation committee has full power to select, from among the individuals eligible for awards, the individuals to whom awards will be granted, to make any combination of awards to participants, and to determine the specific terms and conditions of each award, subject to the provisions of the 2018 Plan. Persons eligible to participate in the 2018 Plan will be those full- or part-time officers, employees, non-employee directors, and other key persons (including consultants) as selected from time to time by our compensation committee in its discretion.

The 2018 Plan permits the granting of both options to purchase common stock intended to qualify as incentive stock options under Section 422 of the Code and options that do not so qualify. The option exercise price of each option will be determined by our compensation committee but may not be less than 100% of the fair market value of our common stock on the date of grant. The term of each option will be fixed by our compensation committee and may not exceed ten years from the date of grant. Our compensation committee will determine at what time or times each option may be exercised.

Our compensation committee may award stock appreciation rights subject to such conditions and restrictions as it may determine. Stock appreciation rights entitle the recipient to shares of common stock, or cash, equal to the value of the appreciation in our stock price over the exercise price. The exercise price may not be less than 100% of the fair market value of our common stock on the date of grant. The term of each stock appreciation right will be fixed by our compensation committee and may not exceed ten years from the date of grant. Our compensation committee will determine at what time or times each stock appreciation right may be exercised.

Our compensation committee may award restricted shares of common stock and restricted stock units to participants subject to such conditions and restrictions as it may determine. These conditions and restrictions may include the achievement of certain performance goals and/or continued employment with us through a specified vesting period. Our compensation committee may also grant shares of common stock that are free from any restrictions under the 2018 Plan. Unrestricted stock may be granted to participants in recognition of past services or for other valid consideration and may be issued in lieu of cash compensation due to such participant.

Our compensation committee may grant dividend equivalent rights to participants that entitle the recipient to receive credits for dividends that would be paid if the recipient had held a specified number of shares of common stock.

Our compensation committee may grant cash bonuses under the 2018 Plan to participants, subject to the achievement of certain performance goals.

The 2018 Plan provides that upon the effectiveness of a “sale event,” as defined in the 2018 Plan, an acquirer or successor entity may assume, continue or substitute outstanding awards under the 2018 Plan. To the extent that awards granted under the 2018 Plan are not assumed or continued or substituted by the successor entity, upon the effective time of the sale event, such awards under the 2018 Plan shall terminate. In such case, except as may be otherwise provided in the relevant award certificate, all options and stock appreciation rights that are not exercisable immediately prior to the sale event shall become fully exercisable as of the effective time of the sale event, all other awards with time-based vesting, conditions or restrictions shall become fully vested and non-forfeitable as of the effective time of the sale event, and all awards with conditions and restrictions relating to the attainment of performance goals may become vested and non-forfeitable in connection with a sale event in the administrator’s discretion or to the extent specified in the relevant award certificate. In the event of such termination, individuals holding options and stock appreciation rights will be permitted to exercise such options and stock appreciation rights (to the extent exercisable) within a specified period of time prior to the sale event. In addition, in connection with the termination of the 2018 Plan upon a sale event, we may make or provide for a cash payment to participants holding vested and exercisable options and stock appreciation rights equal to the difference between the per share cash consideration payable to stockholders in the sale event and the exercise price of the options or stock appreciation rights and we may make or provide for a cash payment to participants holding other vested awards.

Our board of directors may amend or discontinue the 2018 Plan, and our compensation committee may amend or cancel outstanding awards for purposes of satisfying changes in law or any other lawful purpose, but no such action may adversely affect rights under an award without the holder’s consent. Certain amendments to the 2018 Plan require the approval of our stockholders.

No awards may be granted under the 2018 Plan after the date that is ten years from the date of stockholder approval of the 2018 Plan. No awards under the 2018 Plan have been made prior to the date hereof.

2015 Stock Incentive Plan

Our 2015 Stock Incentive Plan (2015 Plan) was approved and adopted by our board of directors on January 29, 2015, and was subsequently approved by our stockholders on January 30, 2015. Initially, under the 2015 Plan, we reserved for issuance an aggregate of 1,910,668 shares of our common stock; however, on June 10, 2015, the plan was amended to increase the aggregate number of shares reserved under the 2015 Plan to 4,144,876 shares of our common stock. This number of shares of common stock reserved for issuance is subject to adjustment in the event of a stock split, reverse stock split, stock dividend, recapitalization, combination of shares, reclassification of shares, spin-off, or other similar change in our capitalization, or any dividend or distribution to holders of common stock other than an ordinary cash dividend.

The shares of common stock underlying awards that expire, awards that are terminated, surrendered or canceled without having been fully exercised, awards that are forfeited, and awards that result in shares of common stock not being issued under the 2015 Plan will be added to the shares of common stock available for issuance under the 2018 Plan. In addition, shares of common stock tendered to us by a participant to exercise an award are added back to the shares available for grant under the 2015 Plan.

Our board of directors has acted as administrator of the 2015 Plan. The administrator has full power to select, from among the individuals eligible for awards, the individuals to whom awards will be granted, and to determine the specific terms and conditions of each award, subject to the provisions of the 2015 Plan. Persons eligible to participate in the 2015 Plan are those employees, officers and directors of, and consultants and advisors to, our company as selected from time to time by the administrator in its discretion.

The 2015 Plan permits the granting of (1) options to purchase common stock intended to qualify as incentive stock options under Section 422 of the Internal Revenue Code of 1986, as amended, (2) options that do not so qualify, (3) restricted stock, (4) restricted stock units, or (5) awards that are valued in whole or in part by reference to common stock, including stock appreciation rights. For stock options, the administrator will determine to establish the per share option exercise price and at what time or times each option may be exercised.

The 2015 Plan provides that upon the occurrence of a merger, consolidation, share exchange transaction, liquidation, or dissolution, our board of directors may take one or more of the following actions (or a combination of the following actions) as to some or any awards outstanding under the 2015 Plan, other than restricted stock awards: (i) provide that outstanding options awards will be assumed or substituted by the acquiring or successor corporation, (ii) upon written notice to participants, provide that all unexercised awards will terminate immediately prior to the consummation of such transaction unless exercised (to the extent exercisable) within a specified period following the date of such notice, (iii) provide that awards shall become exercisable or restrictions shall lapse (in whole or in part) prior to or upon such transaction, or (iv) make or provide for a cash payment to participants equal to the difference between the per share cash consideration in the transaction and the per share exercise price of the outstanding award. The restrictions on restricted stock awards under the 2015 Plan shall inure to the benefit of any successor company on a merger, consolidation, or share exchange transaction, and automatically be deemed terminated or satisfied on a liquidation or dissolution.

Our board of directors may amend, suspend, or terminate the 2015 Plan at any time, subject to stockholder approval where such approval is required by applicable law. Our board of directors may also amend, modify, or terminate any outstanding award, provided that no amendment to an award may adversely affect a participant’s rights without his or her consent.

The 2015 Plan will terminate automatically on January 29, 2025; however, awards previously granted may extend beyond that date. As of January 31, 2018, options to purchase 3,150,889 shares of common stock were outstanding under the 2015 Plan. Our board of directors has determined not to make any further awards under the 2015 Plan following the closing of this offering, and the 982,525 shares of common stock available for future issuance under the 2015 Plan as of the date of approval of the 2018 Plan became available for future issuance under the 2018 Plan.

2018 Employee Stock Purchase Plan

Our 2018 Employee Stock Purchase Plan (ESPP) was adopted by our board of directors on February 28, 2018 and approved by our stockholders on March 16, 2018 and became effective upon the effectiveness of the registration statement of which this prospectus is a part. The ESPP is intended to qualify as an "employee stock purchase plan" within the meaning of Section 423 of the Code. The ESPP initially reserves and authorizes the issuance of up to a total of 314,000 shares of common stock to participating employees. The ESPP provides that the number of shares reserved and available for issuance will automatically increase on January 1, 2019, and each January 1 thereafter through January 1, 2027, by the least of (i) 500,000 shares of common stock, (ii) 1% of the outstanding number of shares of our common stock issued and outstanding on the immediately preceding December 31, or (iii) such lesser number of shares as determined by the ESPP administrator. The number of shares reserved under the ESPP is subject to adjustment in the event of a stock split, stock dividend or other change in our capitalization.

All employees who have been employed at least 30 days and whose customary employment is for more than 20 hours per week are eligible to participate in the ESPP. However, any employee who owns 5% or more of the total combined voting power or value of all classes of stock is not eligible to purchase shares under the ESPP.

We will make one or more offerings each year to our employees to purchase shares under the ESPP. Offerings will usually begin on each January 1 and July 1 and will continue for six-month periods, referred to as offering periods. Each eligible employee may elect to participate in any offering by submitting an enrollment form at least 15 business days before the relevant offering date.

Each employee who is a participant in the ESPP may purchase shares by authorizing payroll deductions of up to 10% of his or her base compensation during an offering period. Unless the participating employee has previously withdrawn from the offering, his or her accumulated payroll deductions will be used to purchase shares on the last business day of the offering period at a price equal to 85% of the fair market value of the shares on the first business day or the last business day of the offering period, whichever is lower, subject to a cap of the number of shares determined by dividing $12,500 by the fair market value of the shares on the first business day of the offering date, or such other lesser number of shares as determined by the ESPP administrator. Under applicable tax rules, an employee may purchase no more than $25,000 worth of shares of common stock, valued at the start of the purchase period, under the ESPP in any calendar year.

The accumulated payroll deductions of any employee who is not a participant on the last day of an offering period will be refunded. An employee's rights under the ESPP terminate upon voluntary withdrawal from the plan or when the employee ceases employment with us for any reason.

The ESPP may be terminated or amended by our board of directors at any time. An amendment that increases the number of shares of common stock authorized under the ESPP and certain other amendments require the approval of our stockholders.

401(k) Plan

We maintain the Unum Therapeutics Inc. 401(k) Plan, a tax-qualified retirement plan for our employees. The 401(k) plan is intended to qualify under Section 401(k) of the Internal Revenue Service Code of 1986, as amended, so that contributions to the 401(k) plan by employees or by us, and the investment earnings thereon, are not taxable to the employees until withdrawn from the 401(k) plan, and so that contributions by us, if any, will be deductible by us when made. Under the 401(k) plan, employees may elect to reduce their current compensation by up to the statutorily prescribed annual limit and to have the amount of such reduction contributed to the 401(k) plan.

DIRECTOR COMPENSATION

2017 Director Compensation

Except as set forth below, in the year ended December 31, 2017, we did not pay any compensation, make any equity awards or non-equity awards to, or pay any other compensation to any of the non-employee members of our board of directors for their service as a director in 2017. Dr. Wilson, our Chief Executive Officer and a member of our board of directors, did not receive any compensation for his service as a member of our board of directors during 2017. Dr. Wilson's compensation for service as an employee for fiscal year 2017 is presented above in the "2017 Summary Compensation Table."

Name	Fees Earned or Paid in Cash ($)	Option Awards ($)	Total ($)
Jörn Aldag	30,000	—	30,000

We have granted options to purchase an aggregate of 57,322 shares of our common stock to two of our non-employee directors in connection with this offering. These options were issued with an exercise price per share equal to the initial public offering price in this offering, and such options vest and become exercisable in equal installments at the end of each month following the vesting start date until the third anniversary of the vesting start date.

Non-Employee Director Compensation Policy

Our board of directors adopted a non-employee director compensation policy, effective as of the completion of this offering, that is designed to enable us to attract and retain, on a long-term basis, highly qualified non-employee directors. Under the policy, each director who is not an employee will be paid cash compensation from and after the completion of this offering, as set forth below:

	Annual Retainer
Board of Directors:	
Members	$35,000
Additional retainer for chair	$30,000
Audit Committee:	
Members	$ 7,500
Chair	$15,000
Compensation Committee:	
Members	$ 5,000
Chair	$10,000
Nominating and Corporate Governance Committee:	
Members	$ 4,000
Chair	$ 8,000

Directors will be given the opportunity to elect to receive all or a portion of their retainer and committee fees in the form of an equity award of (a) unrestricted shares having a grant date fair value equal to the amount (or portion thereof) of such retainer and committee fees or (b) stock options to purchase common stock based on the Black-Scholes option-pricing model as of the date of grant. Any such election shall be made (i) for any continuing non-employee director, before the start of the calendar year with respect to any cash compensation for such calendar year and (ii) for any new non-employee director, within 30 days of her or his election to the board of directors. Any such stock options shall be vested upon grant and shall expire ten years from the date of grant.

Upon his or her election to the board of directors, each non-employee director will receive an initial, one-time stock option grant to purchase 28,661 shares of our common stock, which will vest in equal monthly

installments over three years, subject to continued service as a member of the board of directors. In addition, each continuing non-employee member of the board will receive, at the time of the Company's annual meeting, an annual equity grant of options to purchase 14,331 shares of our common stock, which will vest in full upon the earlier of the first anniversary of the date of grant or the date of the next annual meeting of the Company's stockholders, subject to continued service as a member of the board of directors through such date. Each of the foregoing grants will vest in full upon the death or disability of the applicable director or upon a change in control of the Company. In addition, any stock options awarded to non-employee directors pursuant to the non-employee director compensation policy will be exercisable until the earlier of one year following the termination of the director's service on the board of directors or the original expiration date of the option.

CERTAIN RELATIONSHIPS AND RELATED PARTY TRANSACTIONS

Other than the compensation agreements and other arrangements described under “Executive Compensation” and “Director Compensation” in this prospectus and the transactions described below, since our inception on March 10, 2014, there has not been and there is not currently proposed to be, any transaction or series of similar transactions to which we were, or will be, a party in which the amount involved exceeded, or will exceed, $120,000 and in which any director, executive officer, holder of five percent or more of any class of our capital stock, or any member of the immediate family of, or entities affiliated with, any of the foregoing persons, had, or will have, a direct or indirect material interest.

Sales and Purchases of Securities

Convertible Promissory Note Financing

In June 2014, we issued and sold to Beacon Bioventures Fund III Limited Partnership, a holder of more than 5% of our capital stock and an affiliate of Benjamin Auspitz, then a member of our board of directors, a convertible promissory note in the principal amount of $250,000. The convertible promissory note carried an interest rate of 4.0% per annum.

Series A Preferred Stock Financing

In October 2014, we entered into a Series A Preferred Stock Purchase Agreement, pursuant to which we issued and sold to investors an aggregate of 6,297,276 shares of our Series A preferred stock, consisting of (i) 6,000,000 shares sold for cash proceeds of $6,000,000, at a purchase price of $1.00 per share, and (ii) 297,276 shares issued upon the conversion of $252,685 of principal and accrued interest on the convertible promissory note referred to above, at a conversion price of $0.85 per share, representing a 15% discount to the Series A preferred stock purchase price. In April 2015, we issued and sold to investors 6,000,000 shares of our Series A preferred stock for cash proceeds of $6,000,000, at a purchase price of $1.00 per share.

All 12,297,276 shares Series A preferred stock were issued and sold to members of our board of directors and holders of more than 5% of our capital stock, or entities affiliated with them. The table below summarizes these sales.

Purchaser	Shares of Series A Preferred Stock Purchased	Aggregate Purchase Price ($)
Beacon Bioventures Fund IV Limited Partnership(1)	5,297,276(2)	5,000,000(3)
Atlas Venture Fund IX, L.P.(4)	5,000,000	5,000,000
Aventisub LLC(5)	2,000,000	2,000,000
Total	12,297,276	12,000,000

(1) Beacon Bioventures Fund IV Limited Partnership, which changed its name to F-Prime Capital Partners Healthcare Fund IV LP after the purchase, is affiliated with F-Prime Capital Partners (F-Prime), a holder of more than 5% of our capital stock and an affiliate of Benjamin Auspitz, then a member of our board of directors.
(2) Includes 297,276 shares of Series A preferred stock issued to Beacon Bioventures Fund IV Limited Partnership pursuant to the conversion of a convertible promissory note.
(3) This amount does not include the principal and accrued interest on the convertible promissory note referenced above.
(4) Atlas Venture Fund IX, L.P. is a holder of more than 5% of our capital stock and is affiliated with Dr. Booth, a member of our board of directors.
(5) Aventisub LLC is a holder of more than 5% of our capital stock.

Series B Preferred Stock Financing

In June 2015, we entered into a Series B Preferred Stock Purchase Agreement, pursuant to which we issued and sold to investors an aggregate of 8,474,574 shares of our Series B preferred stock for proceeds of $64,999,990, at a purchase price of $7.67 per share. Of these 8,474,574 shares, 2,346,805 shares were sold to members of our board of directors and holders of more than 5% of our capital stock, or entities affiliated with them. The table below summarizes these sales.

Purchaser	Shares of Series B Preferred Stock Purchased	Aggregate Purchase Price ($)
New Leaf(1)	1,955,671	14,999,997
Beacon Bioventures Fund IV Limited Partnership	130,378	999,999
Atlas Venture Fund IX, L.P.	130,378	999,999
Aventisub LLC	130,378	999,999
Total	2,346,805	17,999,994

(1) New Leaf, through its affiliates New Leaf Ventures III, L.P. and New Leaf Biopharma Opportunities I, L.P., is a holder of more than 5% of our capital stock and is affiliated with Dr. Ratcliffe, a member of our board of directors.

Participation in this Offering

Certain of our existing stockholders, including affiliates of our directors, have agreed to purchase an aggregate of approximately $27.1 million of shares of our common stock in this offering at the initial public offering price, or 2,254,770 of the 5,770,000 shares offered in this offering.

Indemnification Agreements

We have entered into agreements to indemnify our directors and certain of our executive officers. These agreements, among other things, require us to indemnify these individuals for certain expenses (including attorneys' fees), judgments, fines and settlement amounts reasonably incurred by such person in any action or proceeding, including any action by or in our right, on account of any services undertaken by such person on behalf of our company or that person's status as a member of our board of directors to the maximum extent allowed under Delaware law.

Agreements with our Stockholders

In connection with our preferred stock financings, we entered into an amended and restated investors' rights agreement, an amended and restated right of first refusal and co-sale agreement, and an amended and restated voting agreement with the holders of our preferred stock and certain holders of our common stock. The parties to these agreements include members of our board of directors and holders of more than 5% of our capital stock, or entities affiliated with them, and our executive officers.

The amended and restated investors' rights agreement, among other things:

- grants the holders of our preferred stock specified registration rights with respect to shares of our common stock, including common stock issued or issuable upon conversion of the preferred stock held by such stockholders;

- obligates us to provide periodic financial statements to certain holders of our preferred stock;
- grants certain holders of our preferred stock a right of first offer with respect to our sale of new securities, subject to certain exclusions, which includes the securities sold in this offering; and
- specifies certain actions which require the approval of the members of our board of directors appointed by the holders of our preferred stock.

For more information regarding the registration rights provided in the amended and restated investors' rights agreement, please refer to the section titled "Description of Capital Stock – Registration Rights." The provisions of the amended and restated investors' rights agreement, other than those relating to registration rights, will terminate upon the closing of this offering.

The amended and restated right of first refusal and co-sale agreement, among other things, provides first refusal and tag-along sale rights for holders of our preferred stock with respect to transfers by certain stockholders. The provisions of the amended and restated right of first refusal and co-sale agreement will terminate upon the closing of this offering.

The amended and restated voting agreement, among other things, provides for the voting of shares with respect to the constituency of our board of directors and the voting of shares in favor of specified transactions approved by our board of directors and the holders of a requisite percentage of our preferred stock. The provisions of the amended and restated voting agreement will terminate upon the closing of this offering.

Policies for Approval of Related Party Transactions

Our board of directors reviews and approves transactions with directors, officers and holders of five percent or more of our voting securities and their affiliates, each a related party. Prior to this offering, the material facts as to the related party's relationship or interest in such a transaction are disclosed to our board of directors before their consideration of such transaction, and the transaction is not considered approved by our board of directors unless a majority of the directors who are not interested in the transaction approve the transaction. Further, when stockholders are entitled to vote on a transaction with a related party, the material facts of the related party's relationship or interest in the transaction are disclosed to the stockholders, who must approve the transaction in good faith.

In connection with this offering, we adopted a written related party transactions policy that provides that such transactions must be approved by our audit committee or another independent body of our board of directors.

PRINCIPAL STOCKHOLDERS

The following table sets forth certain information known to us regarding beneficial ownership of our capital stock as of January 31, 2018, as adjusted to reflect the sale of common stock offered by us in this offering and the concurrent private placement, for:

- each person or group of affiliated persons known by us to be the beneficial owner of more than five percent of our capital stock;
- each of our named executive officers;
- each of our directors; and
- all of our executive officers and directors as a group.

To the extent that the underwriters sell more than 5,770,000 shares in this offering, the underwriters have the option to purchase up to an additional 865,500 shares at the initial public offering price less the underwriting discount.

Beneficial ownership is determined in accordance with the rules of the SEC and generally includes voting or investment power with respect to securities. Under those rules, beneficial ownership includes any shares as to which the individual or entity has sole or shared voting power or investment power. Except as noted by footnote, and subject to community property laws where applicable, we believe, based on the information provided to us, that the persons and entities named in the table below have sole voting and investment power with respect to all common stock shown as beneficially owned by them.

The percentage of beneficial ownership prior to this offering in the table below is based on 23,431,052 shares of common stock deemed to be outstanding as of January 31, 2018, assuming the conversion of all outstanding shares of our preferred stock upon the closing of this offering, and the percentage of beneficial ownership after this offering in the table below is based on 29,617,718 shares of common stock assumed to be outstanding after the closing of the offering and the concurrent private placement. The information in the table below assumes no exercise of the underwriters' option to purchase additional shares. Options to purchase shares of common stock that are exercisable within 60 days of January 31, 2018 are deemed to be beneficially owned by the persons holding these options for the purpose of computing percentage ownership of that person, but are not treated as outstanding for the purpose of computing any other person's ownership percentage.

Certain of our existing stockholders, including affiliates of our directors, have agreed to purchase an aggregate of approximately $27.1 million of shares of our common stock in this offering at the initial public offering price, or 2,254,770 of the 5,770,000 shares offered in this offering. The table below does not give effect to the purchases by such stockholders in this offering.

Name and Address of Beneficial Owner(1)	Shares Beneficially Owned Prior to Offering and Concurrent Private Placement		Shares Beneficially Owned After Offering and Concurrent Private Placement	
	Number	Percentage	Number	Percentage
5% Stockholders:				
Dario Campana	5,095,114	21.7%	5,095,114	17.2%
Atlas Venture Fund IX, L.P.(2)	3,267,483	13.9%	3,267,483	11.0%
Entities affiliated with F-Prime(3)	2,318,538	9.9%	2,318,538	7.8%
Aventisub LLC(4)	1,356,815	5.8%	1,356,815	4.6%
Entities affiliated with New Leaf(5)	1,245,545	5.3%	1,245,545	4.2%
Named Executive Officers and Directors:				
Jörn Aldag(6)	21,558	*	21,558	*
Bruce Booth, DPhil.(7)	3,267,483	13.9%	3,267,483	11.0%
Karen Ferrante, M.D.	—	—	—	—
Robert Perez	—	—	—	—
Liam Ratcliffe, M.D., Ph.D.(8)	1,245,545	5.3%	1,245,545	4.2%
Charles Wilson, Ph.D.	5,095,114	21.7%	5,095,114	17.2%
Michael Vasconcelles, M.D.(9)	166,609	*	166,609	*
Christiana Stamoulis(10)	426,875	1.8%	426,875	1.4%
All executive officers and directors as a group (10 persons)(11)	10,759,853	43.8%	10,759,853	35.0%

* Represents beneficial ownership of less than one percent.

(1) Unless otherwise indicated, the address for each beneficial owner is c/o Unum Therapeutics Inc., 200 Cambridge Park Drive, Suite 3100, Cambridge, MA 02140.

(2) Consists of 3,267,483 shares of common stock issuable upon conversion of 5,000,000 shares of Series A preferred stock and 130,378 shares of Series B preferred stock held by Atlas Venture Fund IX, L.P. (Atlas Venture Fund IX). All shares are held directly by Atlas Venture Fund IX. Atlas Venture Associates IX, L.P. (AVA IX LP), is the general partner of Atlas Venture Fund IX, and Atlas Venture Associates IX, LLC (AVA IX LLC), is the general partner of AVA IX LP. Peter Barrett, Bruce Booth, Jean-Francois Formela, Jeff Fagnan, and Ryan Moore are the members of AVA IX LLC and collectively make investment decisions on behalf of Atlas Venture Fund IX. Dr. Booth is also a member of our board of directors. Dr. Booth disclaims beneficial ownership of such shares, except to the extent of his pecuniary interest therein, if any. The address for Atlas Venture Fund IX is 25 First Street, Suite 303, Cambridge, MA 02141.

(3) Consists of (i) 358,063 shares of common stock issuable upon conversion of 548,702 shares of Series A preferred stock and 13,505 shares of Series B preferred stock held of record by F-Prime Capital Partners Healthcare Fund IV LP, (ii) 23,240 shares of common stock issuable upon conversion of 35,614 shares of Series A preferred stock and 877 shares of Series B preferred stock held of record by F-Prime Capital Partners Healthcare Advisors Fund IV LP, and (iii) 1,937,235 shares of common stock issuable upon conversion of 2,968,650 shares of Series A preferred stock and 73,065 shares of Series B preferred stock held of record by Impresa Fund III Limited Partnership. 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, its general partner and investment manager. Impresa Management LLC is owned, directly or indirectly, by various shareholders and employees of FMR LLC. The general partner of Impresa Fund III Limited Partnership is Impresa Management 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 address of these entities is 245 Summer Street, Boston, MA 02210.

(4) Consists of 1,356,815 shares of common stock issuable upon conversion of 2,000,000 shares of Series A preferred stock and 130,378 shares of Series B preferred stock held by Aventisub LLC. Aventisub LLC is a

subsidiary of Sanofi-Aventis (Sanofi). Sanofi has the ability to exercise voting and dispositive power over the shares held by Aventisub LLC. The address for Aventisub LLC is c/o Sanofi, 54 rue La Boetie, 75008 Paris, France.

(5) Consists of (i) 622,773 shares of common stock issuable upon conversion of 977,836 shares of Series B preferred stock held by New Leaf Ventures III, L.P., (NLV-III) and (ii) 622,772 shares of common stock issuable upon conversion of 977,835 shares of Series B preferred stock held by New Leaf Biopharma Opportunities I, L.P. (BPO-I). The general partner of NLV-III is New Leaf Venture Associates III, L.P. (NLVA-III). The general partner of BPO-I is New Leaf BPO Associates I, L.P. (NLBA-I). The general partner of both NLVA-III and NLBA-I is New Leaf Venture Management III, L.L.C. (Management-III). Jeani Delagardelle, Ronald M. Hunt, Vijay K. Lathi, and Liam Ratcliffe, a member of our board of directors, are individual members of Management-III (Individual Members) which is responsible for the investment decisions of NLV-III and BPO-I. Each of the Individual Members disclaim beneficial ownership of the shares held by NLV-III and BPO-I except to the extent of their pecuniary interest therein. The address of the entities and individuals listed above is 7 Times Square, Suite 3502, New York, New York 10036. Dr. Ratcliffe is a Managing Director at New Leaf Venture Partners, L.L.C., an affiliate of NLV-III and BPO-I.

(6) Consists of options to purchase 21,558 shares of common stock that are exercisable within 60 days of January 31, 2018.

(7) See note (2) above.

(8) See note (5) above.

(9) Consists of options to purchase 166,609 shares of common stock that are exercisable within 60 days of January 31, 2018.

(10) Consists of options to purchase 426,875 shares of common stock that are exercisable within 60 days of January 31, 2018.

(11) Includes options to purchase 1,151,711 shares of common stock that are exercisable within 60 days of January 31, 2018.

DESCRIPTION OF CAPITAL STOCK

The following descriptions are summaries of the material terms of our amended and restated certificate of incorporation and amended and restated bylaws which will be effective immediately upon the closing of this offering. The descriptions of the common stock and preferred stock give effect to changes to our capital structure that will occur immediately upon the closing of this offering. We refer in this section to our amended and restated certificate of incorporation as our certificate of incorporation, and we refer to our amended and restated bylaws as our bylaws.

General

Upon closing of this offering, our authorized capital stock will consist of 150,000,000 shares of common stock, par value $0.001 per share, and 10,000,000 shares of preferred stock, par value $0.001 per share, all of which shares of preferred stock will be undesignated.

As of January 31, 2018, 23,431,052 shares of our common stock were outstanding and held by 21 stockholders of record. This amount assumes the conversion of all outstanding shares of our preferred stock into common stock, which will occur immediately upon the closing of this offering. In addition, as of January 31, 2018, we had outstanding options to purchase 3,150,889 shares of our common stock under our 2015 Stock Incentive Plan (2015 Plan), at a weighted average exercise price of $4.01 per share, 1,592,487 of which were exercisable.

Common Stock

The holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of the stockholders. The holders of our common stock do not have any cumulative voting rights. Holders of our common stock are entitled to receive ratably any dividends declared by our board of directors out of funds legally available for that purpose, subject to any preferential dividend rights of any outstanding preferred stock. Our common stock has no preemptive rights, conversion rights, or other subscription rights or redemption or sinking fund provisions.

In the event of our liquidation, dissolution, or winding up, holders of our common stock will be entitled to share ratably in all assets remaining after payment of all debts and other liabilities and any liquidation preference of any outstanding preferred stock. The shares to be issued by us in this offering will be, when issued and paid for, validly issued, fully paid and non-assessable.

Preferred Stock

Immediately upon the closing of this offering, all outstanding shares of our preferred stock will be converted into shares of our common stock. Upon the closing of this offering, our board of directors will have the authority, without further action by our stockholders, to issue up to 10,000,000 shares of preferred stock in one or more series and to fix the rights, preferences, privileges and restrictions thereof. These rights, preferences and privileges could include dividend rights, conversion rights, voting rights, terms of redemption, liquidation preferences, sinking fund terms and the number of shares constituting, or the designation of, such series, any or all of which may be greater than the rights of common stock. The issuance of our preferred stock could adversely affect the voting power of holders of common stock and the likelihood that such holders will receive dividend payments and payments upon our liquidation. In addition, the issuance of preferred stock could have the effect of delaying, deferring or preventing a change in control of our company or other corporate action. Immediately after closing of this offering, no shares of preferred stock will be outstanding, and we have no present plan to issue any shares of preferred stock.

Registration Rights

Upon the closing of this offering, the holders of 13,646,028 shares of our common stock, inclusive of 416,666 shares of our common stock purchased by Seattle Genetics in the concurrent private placement, including those issuable upon the conversion of preferred stock, are entitled to rights with respect to the registration of such securities under the Securities Act. These rights are provided under the terms of an amended and restated investors' rights agreement between us and certain holders our common stock and our preferred stock. The amended and restated investors' rights agreement includes demand registration rights, short-form registration rights, and piggyback registration rights. All fees, costs and expenses of underwritten registrations under these agreements will be borne by us and all selling expenses, including underwriting discounts and selling commissions, will be borne by the holders of the shares being registered.

Demand Registration Rights

Beginning 180 days after the closing of this offering, the holders of 13,646,028 shares of our common stock, inclusive of 416,666 shares of our common stock purchased by Seattle Genetics in the concurrent private placement, including those issuable upon the conversion of shares of our preferred stock, are entitled to demand registration rights. Under the terms of the amended and restated investors' rights agreement, we will be required, upon the written request of holders of at least 30% of these securities, to file a registration statement and use commercially reasonable efforts to effect the registration of all or a portion of these shares for public resale. We are required to effect only two registrations pursuant to this provision of the investor rights agreement.

Short-Form Registration Rights

The holders of 13,646,028 shares of our common stock, inclusive of 416,666 shares of our common stock purchased by Seattle Genetics in the concurrent private placement, including those issuable upon the conversion of shares of our preferred stock, are entitled to short-form registration rights. Under the terms of the amended and restated investors' rights agreement, if we are eligible to file a registration statement on Form S-3, upon the written request of 15% in interest of these holders to sell registrable securities at an anticipated aggregate price of at least $5 million, we will be required to use commercially reasonable efforts to effect a registration of such shares. We are required to effect only two registrations in any 12-month period pursuant to this provision of the amended and restated investors' rights agreement.

Piggyback Registration Rights

The holders of 13,646,028 shares of our common stock, inclusive of 416,666 shares of our common stock purchased by Seattle Genetics in the concurrent private placement, including those issuable upon the conversion of shares of our preferred stock, are 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 these shares are entitled to include their shares in the registration. Subject to certain exceptions contained in the amended and restated investors' rights agreement, we and the underwriters may limit the number of shares included in the underwritten offering to the number of shares which we and the underwriters determine in our sole discretion will not jeopardize the success of the offering.

Indemnification

Our amended and restated investors' rights agreement contains customary cross-indemnification provisions, under which we are obligated to indemnify holders of registrable securities in the event of material misstatements or omissions in the registration statement attributable to us, and they are obligated to indemnify us for material misstatements or omissions attributable to them.

Expenses of Registration

We are generally required to bear all registration and selling expenses incurred in connection with the demand, short-form and piggyback registration described above, other than underwriting discounts and selling commissions.

Expiration of Registration Rights

The demand registration rights and short form registration rights granted under the amended and restated investors' rights agreement will terminate as to a given holder of registrable securities on the earliest to occur of (i) the fifth anniversary of the closing of this offering, (ii) such time as Rule 144 or another similar exemption under the Securities Act is available for the sale of all of such holder's shares without limitation during a three-month period without registration and (iii) the closing of a deemed liquidation event, as such term is defined in our certificate of incorporation.

Anti-Takeover Effects of our Certificate of Incorporation and Bylaws and Delaware Law

Our certificate of incorporation and bylaws include a number of provisions that may have the effect of delaying, deferring or preventing another party from acquiring control of us and encouraging persons considering unsolicited tender offers or other unilateral takeover proposals to negotiate with our board of directors rather than pursue non-negotiated takeover attempts. These provisions include the items described below.

Undesignated Preferred Stock

Our certificate of incorporation provides for 10,000,000 authorized shares of preferred stock. The existence of authorized but unissued shares of preferred stock may enable our board of directors to discourage an attempt to obtain control of us by means of a merger, tender offer, proxy contest or otherwise. For example, if in the due exercise of its fiduciary obligations, our board of directors were to determine that a takeover proposal is not in the best interests of our stockholders, our board of directors could cause shares of preferred stock to be issued without stockholder approval in one or more private offerings or other transactions that might dilute the voting or other rights of the proposed acquirer or insurgent stockholder or stockholder group. In this regard, our certificate of incorporation grants our board of directors broad power to establish the rights and preferences of authorized and unissued shares of preferred stock. The issuance of shares of preferred stock could decrease the amount of earnings and assets available for distribution to holders of shares of common stock. The issuance may also adversely affect the rights and powers, including voting rights, of these holders and may have the effect of delaying, deterring, or preventing a change in control of us.

Section 203 of the Delaware General Corporation Law

Upon closing of this offering, we will be subject to the provisions of Section 203 of the Delaware General Corporation Law. In general, Section 203 prohibits a publicly held Delaware corporation from engaging in a "business combination" with an "interested stockholder" for a three-year period following the time that this stockholder becomes an interested stockholder, unless the business combination is approved in a prescribed manner. Under Section 203, a business combination between a corporation and an interested stockholder is prohibited unless it satisfies one of the following conditions:

- before the stockholder became interested, our board of directors approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder;
- upon consummation of the transaction which resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the voting stock outstanding, shares owned by persons who are directors and also officers, and employee stock plans, in some instances, but not the outstanding voting stock owned by the interested stockholder; or

- at or after the time the stockholder became interested, the business combination was approved by our board of directors and authorized at an annual or special meeting of the stockholders by the affirmative vote of at least two-thirds of the outstanding voting stock which is not owned by the interested stockholder.

Section 203 defines a business combination to include:

- any merger or consolidation involving the corporation and the interested stockholder;
- any sale, transfer, lease, pledge or other disposition involving the interested stockholder of 10% or more of the assets of the corporation;
- subject to exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder;
- subject to exceptions, any transaction involving the corporation that has the effect of increasing the proportionate share of the stock of any class or series of the corporation beneficially owned by the interested stockholder; and
- the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges, or other financial benefits provided by or through the corporation.

In general, Section 203 defines an interested stockholder as any entity or person beneficially owning 15% or more of the outstanding voting stock of the corporation and any entity or person affiliated with or controlling or controlled by the entity or person.

Amended and Restated Certificate of Incorporation and Amended and Restated Bylaws

Provisions of our amended and restated certificate of incorporation and bylaws may delay or discourage transactions involving an actual or potential change in our control or change in our management, including transactions in which stockholders might otherwise receive a premium for their shares or transactions that our stockholders might otherwise deem to be in their best interests. Therefore, these provisions could adversely affect the price of our common stock. Among other things, our amended and restated certificate of incorporation and amended and restated bylaws:

- permit our board of directors to issue up to 10,000,000 shares of preferred stock, with any rights, preferences and privileges as they may designate;
- provide that the authorized number of directors may be changed only by resolution adopted by a majority of the board of directors;
- provide that the board of directors or any individual director may only be removed with cause and the affirmative vote of the holders of at least 66.67% of the voting power of all of our then outstanding common stock;
- provide that all vacancies, including newly created directorships, may, except as otherwise required by law or subject to the rights of holders of preferred stock as designated from time to time, be filled by the affirmative vote of a majority of directors then in office, even if less than a quorum;
- divide our board of directors into three classes;
- require that any action to be taken by our stockholders must be effected at a duly called annual or special meeting of stockholders and not be taken by written consent or electronic transmission;
- provide that stockholders seeking to present proposals before a meeting of stockholders or to nominate candidates for election as directors at a meeting of stockholders must provide notice in writing in a timely manner and also specify requirements as to the form and content of a stockholder’s notice;

- do not provide for cumulative voting rights (therefore allowing the holders of a majority of the shares of common stock entitled to vote in any election of directors to elect all of the directors standing for election, if they should so choose);
- provide that special meetings of our stockholders may be called only by the chairperson of the board, our chief executive officer, or by the board of directors pursuant to a resolution adopted by a majority of the total number of authorized directors (whether or not there exists any vacancies); and
- provide that the Court of Chancery of the State of Delaware will be the sole and exclusive forum for (i) any derivative action or proceeding brought on our behalf, (ii) any action asserting a claim of breach of a fiduciary duty owed by any of our directors or officers to us or our stockholders, (iii) any action asserting a claim against the us arising pursuant to any provision of the DGCL or our certificate of incorporation or bylaws, or (iv) any action asserting a claim against us governed by the internal affairs doctrine.

The amendment of any of these provisions, with the exception of the ability of our board of directors to issue shares of preferred stock and designate any rights, preferences, and privileges thereto, would require the affirmative vote of the holders of at least 66.67% of the voting power of all of our then outstanding common stock.

Nasdaq Global Select Market Listing

Our common stock has been approved for listing on The Nasdaq Global Select Market under the trading symbol “UMRX.”

Transfer Agent and Registrar

The transfer agent and registrar for our common stock will be Computershare Trust Company, N.A. The transfer agent and registrar’s address is 250 Royall Street, Canton, Massachusetts 02021, and its telephone number is (800) 962-4284.

SHARES ELIGIBLE FOR FUTURE SALE

Prior to this offering, there has been no public market for shares of our common stock. Future sales of our common stock in the public market, or the availability of such shares for sale in the public market, could adversely affect market prices prevailing from time to time. As described below, only a limited number of shares will be available for sale shortly after this offering due to contractual and legal restrictions on resale. Nevertheless, sales of our common stock in the public market after such restrictions lapse, or the perception that those sales may occur, could adversely affect the prevailing market price at such time and our ability to raise equity capital in the future.

Based on the number of shares outstanding as of January 31, 2018, upon the closing of this offering and the concurrent private placement, 29,617,718 shares of our common stock will be outstanding, assuming no exercise of the underwriters' option to purchase additional shares and no exercise of outstanding options. Of the outstanding shares, all of the shares sold in this offering will be freely tradable, except that any shares held by our affiliates, as that term is defined in Rule 144 under the Securities Act, may only be sold in compliance with the limitations described below.

Rule 144

In general, a person who has beneficially owned restricted stock for at least six months would be entitled to sell their securities provided that (i) such person is not deemed to have been one of our affiliates at the time of, or at any time during the 90 days preceding, a sale and (ii) we are subject to the Securities Exchange Act of 1934, as amended, periodic reporting requirements for at least 90 days before the sale. Persons who have beneficially owned restricted shares for at least six months but who are our affiliates at the time of, or any time during the 90 days preceding, a sale, would be subject to additional restrictions, by which such person would be entitled to sell within any three-month period only a number of securities that does not exceed the greater of either of the following:

- 1% of the number of shares then outstanding, which will equal approximately 296,177 shares immediately after this offering and the concurrent private placement assuming no exercise of the underwriters' option to purchase additional shares, based on the number of shares outstanding as of January 31, 2018; or
- the average weekly trading volume of our common stock on The Nasdaq Global Select Market during the four calendar weeks preceding the filing of a notice on Form 144 with respect to the sale;

provided, in each case, that we are subject to the Exchange Act periodic reporting requirements for at least 90 days before the sale. Such sales both by affiliates and by non-affiliates must also comply with the manner of sale, current public information and notice provisions of Rule 144.

Certain of our existing stockholders, including affiliates of our directors, have agreed to purchase an aggregate of approximately $27.1 million of shares of our common stock in this offering at the initial public offering price. Any such shares purchased by stockholders who are considered to be our affiliates cannot be resold in the public market immediately following this offering as a result of restrictions under securities laws, but will be able to be sold following the expiration of these restrictions, as described below.

Rule 701

Rule 701 under the Securities Act, as in effect on the date of this prospectus, permits resales of shares in reliance upon Rule 144 but without compliance with certain restrictions of Rule 144, including the holding period requirement. Most of our employees, executive officers or directors who purchased shares under a written compensatory plan or contract may be entitled to rely on the resale provisions of Rule 701, but all holders of

Rule 701 shares are required to wait until 90 days after the date of this prospectus before selling their shares. However, substantially all Rule 701 shares are subject to lock-up agreements as described below and under “Underwriters” included elsewhere in this prospectus and will become eligible for sale upon the expiration of the restrictions set forth in those agreements.

Lock-Up Agreements

All of our directors and officers and substantially all the holders of all of our outstanding stock and stock options have signed a lock-up agreement which prevents them from selling any of our common stock or any securities convertible into or exercisable or exchangeable for common stock for a period of not less than 180 days from the date of this prospectus without the prior written consent of the representatives, subject to certain exceptions. See “Underwriters.”

Registration Rights

Upon closing of this offering, certain holders of our securities will be entitled to various rights with respect to registration of their 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. See “Description of Capital Stock—Registration Rights” for additional information.

Equity Incentive Plans

We intend to file one or more registration statements on Form S-8 under the Securities Act to register our shares issued or reserved for issuance under our equity incentive plans. The first such registration statement is expected to be filed soon after the date of this prospectus and will automatically become effective upon filing with the SEC. Accordingly, shares registered under such registration statement will be available for sale in the open market, unless such shares are subject to vesting restrictions with us or the lock-up restrictions described above. As of March 19, 2018, we estimate that such registration statement on Form S-8 will cover approximately 6,994,972 shares.

10b5-1 Plans

After the offering, certain of our employees, including our executive officers and/or directors may enter into written trading plans that are intended to comply with Rule 10b5-1 under the Exchange Act. Sales under these trading plans would not be permitted until the expiration of the lock-up agreements relating to the offering described above.

MATERIAL U.S. FEDERAL INCOME TAX CONSIDERATIONS FOR NON-U.S. HOLDERS OF COMMON STOCK

The following discussion is a summary of the material U.S. federal income tax considerations applicable to non-U.S. holders (as defined below) with respect to their ownership and disposition of shares of our common stock issued pursuant to this offering. For purposes of this discussion, a non-U.S. holder means a beneficial owner of our common stock that is for U.S. federal income tax purposes:

- a non-resident alien individual;
- a foreign corporation or any other foreign organization taxable as a corporation for U.S. federal income tax purposes; or
- a foreign estate or trust, the income of which is not subject to U.S. federal income tax on a net income basis.

This discussion does not address the tax treatment of partnerships or other entities that are pass-through entities for U.S. federal income tax purposes or persons that hold their common stock through partnerships or other pass-through entities. A partner in a partnership or other pass-through entity that will hold our common stock should consult his, her or its own tax advisor regarding the tax consequences of acquiring, holding and disposing of our common stock through a partnership or other pass-through entity, as applicable. This summary does not apply to any shares acquired in the concurrent private placement.

This discussion is based on current provisions of the U.S. Internal Revenue Code of 1986, as amended, which we refer to as the Code, existing and proposed U.S. Treasury Regulations promulgated thereunder, current administrative rulings and judicial decisions, all as in effect as of the date of this prospectus and, all of which are subject to change or to differing interpretation, possibly with retroactive effect. Any such change or differing interpretation could alter the tax consequences to non-U.S. holders described in this prospectus. There can be no assurance that the Internal Revenue Service, which we refer to as the IRS, will not challenge one or more of the tax consequences described herein. We assume in this discussion that a non-U.S. holder holds shares of our common stock as a capital asset, generally property held for investment.

This discussion does not address all aspects of U.S. federal income taxation that may be relevant to a particular non-U.S. holder in light of that non-U.S. holder's individual circumstances nor does it address any aspects of any U.S. federal tax other than the income tax, U.S. state, local or non-U.S. taxes, the alternative minimum tax, or the Medicare tax on net investment income. This discussion also does not consider any specific facts or circumstances that may apply to a non-U.S. holder and does not address the special tax rules applicable to particular non-U.S. holders, such as:

- insurance companies;
- tax-exempt or governmental organizations;
- financial institutions;
- brokers or dealers in securities;
- regulated investment companies;
- pension plans;
- "controlled foreign corporations," "passive foreign investment companies," and corporations that accumulate earnings to avoid U.S. federal income tax;
- "qualified foreign pension funds," or entities wholly owned by a "qualified foreign pension fund";
- partnerships or other entities or arrangements treated as partnerships for U.S. federal income tax purposes (and partners and investors therein);
- persons that have a functional currency other than the U.S. dollar;

- persons deemed to sell our common stock under the constructive sale provisions of the Code;
- persons that hold our common stock as part of a straddle, hedge, conversion transaction, synthetic security, or other integrated investment;
- persons who hold or receive our common stock pursuant to the exercise of any employee stock option or otherwise as compensation;
- persons for whom our stock constitutes "qualified small business stock" within the meaning of Section 1202 of the Code; and
- certain U.S. expatriates.

This discussion is for general information only and is not tax advice. Accordingly, all prospective non-U.S. holders of our common stock should consult their own tax advisors with respect to the U.S. federal, state, local, and non-U.S. tax consequences of the purchase, ownership and disposition of our common stock.

Distributions on Our Common Stock

Distributions, if any, on our common stock 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. If a distribution exceeds our current and accumulated earnings and profits, the excess will be treated as a tax-free return of the non-U.S. holder's investment, up to such holder's tax basis in the common stock. Any remaining excess will be treated as capital gain, subject to the tax treatment described below in "Gain on sale, exchange or other disposition of our common stock." Any such distributions will also be subject to the discussions below under the sections titled "Backup Withholding and Information Reporting" and "Withholding and Information Reporting Requirements—FATCA."

Subject to the discussion in the following two paragraphs in this section, dividends paid to a non-U.S. holder generally will be subject to withholding of U.S. federal income tax at a 30% rate or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder's country of residence.

Dividends that are treated as effectively connected with a trade or business conducted by a non-U.S. holder within the United States and, if an applicable income tax treaty so provides, that are attributable to a permanent establishment or a fixed base maintained by the non-U.S. holder within the United States, are generally exempt from the 30% withholding tax if the non-U.S. holder satisfies applicable certification and disclosure requirements. However, such U.S. effectively connected income, net of specified deductions and credits, is taxed at the same graduated U.S. federal income tax rates applicable to United States persons (as defined in the Code). Any U.S. effectively connected income received by a non-U.S. holder that is a corporation may also, under certain circumstances, be subject to an additional "branch profits tax" at a 30% rate or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder's country of residence.

A non-U.S. holder of our common stock who claims the benefit of an applicable income tax treaty between the United States and such holder's country of residence generally will be required to provide a properly executed IRS Form W-8BEN or W-8BEN-E (or successor form) to the applicable withholding agent and satisfy applicable certification and other requirements. Non-U.S. holders are urged to consult their tax advisors regarding their entitlement to benefits under a relevant income tax treaty. A non-U.S. holder that is eligible for a reduced rate of U.S. withholding tax under an income tax treaty may obtain a refund or credit of any excess amounts withheld by timely filing a U.S. tax return with the IRS.

Gain on Sale or Other Taxable Disposition of Our Common Stock

Subject to the discussions below under "Backup Withholding and Information Reporting" and "Withholding and Information Reporting Requirements – FATCA," a non-U.S. holder generally will not be subject to any U.S.

federal income tax on any gain realized upon such holder's sale or other taxable disposition of shares of our common stock unless:

- the gain is effectively connected with the non-U.S. holder's conduct of a U.S. trade or business and, if an applicable income tax treaty so provides, is attributable to a permanent establishment or a fixed-base maintained by such non-U.S. holder in the United States, in which case the non-U.S. holder generally will be taxed on a net income basis at the graduated U.S. federal income tax rates applicable to United States persons (as defined in the Code) and, if the non-U.S. holder is a foreign corporation, the branch profits tax described above in "Distributions on Our Common Stock" also may apply;
- the non-U.S. holder is a nonresident alien individual who is present in the United States for 183 days or more in the taxable year of the disposition and certain other conditions are met, in which case the non-U.S. holder will be subject to a 30% tax (or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder's country of residence) on the net gain derived from the disposition, which may be offset by certain U.S. source capital losses of the non-U.S. holder, if any (even though the individual is not considered a resident of the United States), provided that the non-U.S. holder has timely filed U.S. federal income tax returns with respect to such losses; or
- we are, or have been, at any time during the five-year period preceding such sale of other taxable disposition (or the non-U.S. holder's holding period, if shorter) a "U.S. real property holding corporation," unless our common stock is regularly traded on an established securities market and the non-U.S. holder holds no more than 5% of our outstanding common stock, directly or indirectly, actually or constructively, during the shorter of the 5-year period ending on the date of the disposition or the period that the non-U.S. holder held our common stock. 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. Although there can be no assurance, we do not believe that we are, or have been, a U.S. real property holding corporation, or that we are likely to become one in the future. No assurance can be provided that our common stock will be regularly traded on an established securities market for purposes of the rules described above.

Backup Withholding and Information Reporting

We must report annually to the IRS and to each non-U.S. holder the gross amount of the distributions on our common stock paid to such holder and the tax withheld, if any, with respect to such distributions. Non-U.S. holders may have to comply with specific certification procedures to establish that the holder is not a United States person (as defined in the Code) in order to avoid backup withholding at the applicable rate with respect to dividends on our common stock. Dividends paid to non-U.S. holders subject to withholding of U.S. federal income tax, as described above in "Distributions on Our Common Stock," generally will be exempt from U.S. backup withholding.

Information reporting and backup withholding will generally apply to the proceeds of a disposition of our common stock by a non-U.S. holder effected by or through the U.S. office of any broker, U.S. or foreign, unless the holder certifies its status as a non-U.S. holder and satisfies certain other requirements, or otherwise establishes an exemption. Generally, information reporting and backup withholding will not apply to a payment of disposition proceeds to a non-U.S. holder where the transaction is effected outside the United States through a non-U.S. office of a broker. However, for information reporting purposes, dispositions effected through a non-U.S. office of a broker with substantial U.S. ownership or operations generally will be treated in a manner similar to dispositions effected through a U.S. office of a broker. Non-U.S. holders should consult their own tax advisors regarding the application of the information reporting and backup withholding rules to them. Copies of information returns may be made available to the tax authorities of the country in which the non-U.S. holder resides or is incorporated under the provisions of a specific treaty or agreement. Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules from a payment to a non-U.S. holder

can be refunded or credited against the non-U.S. holder's U.S. federal income tax liability, if any, provided that an appropriate claim is filed with the IRS in a timely manner.

Withholding and Information Reporting Requirements—FATCA

The Foreign Account Tax Compliance Act (FATCA) generally imposes a U.S. federal withholding tax at a rate of 30% on payments of dividends on, or gross proceeds from the sale or other disposition of, our common stock paid to a foreign entity unless (i) if the foreign entity is a "foreign financial institution," such foreign entity undertakes certain due diligence, reporting, withholding, and certification obligations, (ii) if the foreign entity is not a "foreign financial institution," such foreign entity identifies certain of its U.S. investors, if any, or (iii) the foreign entity is otherwise exempt under FATCA. Under applicable U.S. Treasury regulations, withholding under FATCA currently applies to payments of dividends on our common stock, but will only apply to payments of gross proceeds from a sale or other disposition of our common stock made after December 31, 2018. Under certain circumstances, a non-U.S. holder may be eligible for refunds or credits of this withholding tax. An intergovernmental agreement between the United States and an applicable foreign country may modify the requirements described in this paragraph. Non-U.S. holders should consult their tax advisors regarding the possible implications of this legislation on their investment in our common stock and the entities through which they hold our common stock, including, without limitation, the process and deadlines for meeting the applicable requirements to prevent the imposition of the 30% withholding tax under FATCA.

UNDERWRITERS

Under the terms and subject to the conditions in an underwriting agreement dated the date of this prospectus, the underwriters named below, for whom Morgan Stanley & Co. LLC and Cowen and Company, LLC are acting as representatives, have severally agreed to purchase, and we have agreed to sell to them, severally, the number of shares indicated below:

Name	Number of Shares
Morgan Stanley & Co. LLC	2,596,500
Cowen and Company, LLC	2,019,500
SunTrust Robinson Humphrey, Inc.	577,000
Wedbush Securities Inc.	577,000
Total	5,770,000

The underwriters and the representatives are collectively referred to as the “underwriters” and the “representatives,” respectively. The underwriters are offering the shares of common stock subject to their acceptance of the shares from us and subject to prior sale. The underwriting agreement provides that the obligations of the several underwriters to pay for and accept delivery of the shares of common stock offered by this prospectus are subject to the approval of certain legal matters by their counsel and to certain other conditions. The underwriters are obligated to take and pay for all of the shares of common stock offered by this prospectus if any such shares are taken. However, the underwriters are not required to take or pay for the shares covered by the underwriters’ over-allotment option described below.

The underwriters initially propose to offer part of the shares of common stock directly to the public at the offering price listed on the cover page of this prospectus and part to certain dealers at a price that represents a concession not in excess of $0.504 per share under the public offering price. After the initial offering of the shares of common stock, the offering price, and other selling terms may from time to time be varied by the representatives. We have granted to the underwriters an option, exercisable for 30 days from the date of this prospectus, to purchase up to 865,500 additional shares of common stock at the public offering price listed on the cover page of this prospectus, less underwriting discounts and commissions. The underwriters may exercise this option solely for the purpose of covering over-allotments, if any, made in connection with the offering of the shares of common stock offered by this prospectus. To the extent the option is exercised, each underwriter will become obligated, subject to certain conditions, to purchase about the same percentage of the additional shares of common stock as the number listed next to the underwriter’s name in the preceding table bears to the total number of shares of common stock listed next to the names of all underwriters in the preceding table.

The following table shows the per share and total public offering price, underwriting discounts and commissions, and proceeds before expenses to us. These amounts are shown assuming both no exercise and full exercise of the underwriters’ option to purchase up to an additional 865,500 shares of common stock.

	Per Share	Total	
		No Exercise	Full Exercise
Public offering price	$12.00	$69,240,000	$ 79,626,000
Underwriting discounts and commissions to be paid by us	$ 0.84	$ 4,846,800	$ 5,573,820
Proceeds, before expenses, to us	$11.16	$64,393,200	$ 74,052,180

The estimated offering expenses payable by us, exclusive of underwriting discounts and commissions, are approximately $2.8 million. We have agreed to reimburse the underwriters for expenses relating to clearance of this offering with the Financial Industry Regulatory Authority and the qualification of our common stock under state securities laws up to $30,000.

The underwriters have informed us that they do not intend sales to discretionary accounts to exceed 5% of the total number of shares of common stock offered by them.

Our common stock has been approved for listing on The Nasdaq Global Select Market under the trading symbol “UMRX.”

We and all of our directors and officers and the holders of substantially all of our outstanding stock and stock options have agreed that, without the prior written consent of the representatives on behalf of the underwriters, we and they will not, during the period ending 180 days after the date of this prospectus (the “restricted period”):

- 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, lend, or otherwise transfer or dispose of, directly or indirectly, any shares of common stock or any securities convertible into or exercisable or exchangeable for shares of common stock;
- file any registration statement with the Securities and Exchange Commission relating to the offering of any shares of common stock or any securities convertible into or exercisable or exchangeable for common stock; or
- 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 shares of common stock,

whether any such transaction described above is to be settled by delivery of shares of common stock or such other securities, in cash or otherwise. In addition, we and each such person agrees that, without the prior written consent of the representatives on behalf of the underwriters, we or such other person will not, during the restricted period, 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.

The restrictions described in the immediately preceding paragraph to do not apply to:

- transfers of shares of common stock or other securities acquired in this offering or acquired in open market transactions after this offering;
- transfers of shares of common stock or any security convertible into or exercisable or exchangeable for common stock as a bona fide gift, including without limitation to a charitable organization;
- distributions of shares of common stock or any security convertible into or exercisable or exchangeable for common stock to limited partners, general partners, managers, directors, officers, employees, members, stockholders or trust beneficiaries or to any controlled investment fund or other entity, including transfers or distributions of shares to a fund managed by the same manager or managing member or general partner or management company or by an entity controlling, controlled by, or under common control with such manager or managing member or general partner or managing company or who shares a common investment advisor;
- transfers or dispositions of shares of common stock or any security convertible into or exercisable or exchangeable for common stock by will or other testamentary document or by intestacy;
- transfers or dispositions of shares of common stock or any security convertible into or exercisable or exchangeable for common stock to any trust for the direct or indirect benefit of immediate family members in a transaction not involving a disposition for value;
- the exercise of options to purchase shares of common stock granted under a stock incentive plan or stock purchase plan described in this prospectus and outstanding as of the date of this prospectus or the exercise of warrants to purchase shares of common stock (or any security convertible into or exercisable or exchangeable for common stock) described in this prospectus and outstanding as of the date of this prospectus, provided that the underlying common stock continues to be subject to the restrictions set forth above and, provided further that any public filing or public announcement under Section 16(a) of the Exchange Act required or voluntarily made during the restricted period in

connection with the exercise of such stock option or warrant shall clearly indicate in the footnotes thereto or comments section thereof that the filing relates to the exercise of a stock option or warrant, as the case may be, that the shares of common stock received upon exercise of the stock option or warrant are subject to a lock-up agreement with the underwriters of this offering;

- transfers of shares of common stock or any security convertible into or exchangeable for common stock that occur by operation of law pursuant to a qualified domestic order or in connection with a divorce settlement;
- transfers or dispositions of shares of common stock or any security convertible into or exercisable or exchangeable for common stock to us pursuant to any contractual arrangement disclosed to the representatives and in effect on the date of this prospectus that provides for the repurchase of common stock or such other securities by us solely in connection with the termination of employment with us, provided that the repurchase price for any such shares or securities shall not exceed the original purchase price (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization) paid to us for such shares or securities and, provided further that any public filing or public announcement under Section 16(a) of the Exchange Act required or voluntarily made during the restricted period in connection with such transfer or disposition shall clearly indicate in the footnotes thereto or comments section thereof that such transfer or disposition was made solely to us pursuant to the circumstances described above;
- the establishment of a trading plan that satisfies the requirements of Rule 10b5-1 under the Exchange Act for the transfer of shares of common stock, provided that (i) such plan does not provide for the transfer of shares of common stock during the restricted period and (ii) no public announcement or filing under the Exchange Act regarding the establishment of such plan shall be required or shall be voluntarily made during the restricted period;
- transfers to us of shares of common stock upon a vesting event or upon the exercise of options or warrants to purchase common stock, in each case on a “cashless” or “net exercise” basis solely to cover tax withholding obligations in connection with such vesting or exercise; and
- transfers in connection with a bona fide third party tender offer, merger, consolidation or other similar transaction involving a change of control that is approved by our board of directors, made to all holders of our common stock and occurring after the closing of this offering, provided that in the event that the tender offer, merger, consolidation or other such transaction is not completed, the shares of common stock shall remain subject to the restrictions in the immediately preceding paragraph;

provided further that (i) in the case of any transfer or distribution as described in the first, second, third, fourth, fifth, or seventh bullet point above, the recipient shall agree to be subject to the restrictions described in the immediately preceding paragraph and (ii) in the case of any transfer or distribution described in the first, second, third, fourth, fifth, seventh, or tenth bullet point above, no filing under Section 16(a) of the Exchange Act, reporting a reduction in beneficial ownership of shares of common stock, shall be required or shall be voluntarily made during the restricted period.

In addition, the restrictions described in the paragraph above relating to us do not apply to:

- the shares to be sold in this offering;
- our issuance of shares of common stock upon the exercise of an option or warrant or the conversion of a security outstanding on the date of this prospectus pursuant to stock plans disclosed in this prospectus;
- the establishment of a trading plan pursuant to Rule 10b5-1 under the Exchange Act for the transfer of shares of common stock, provided that such plan does not provide for the transfer of shares of common stock during the restricted period and to the extent a public announcement or filing under the Exchange Act is required of or voluntarily made by the Company regarding the establishment of such plan, such

announcement or filing shall include a statement to the effect that no transfer of shares of common stock may be made under such plan during the restricted period;

- the filing of a registration statement on Form S-8 or a successor form thereto in respect of any shares of common stock issued under or the grant of any award pursuant to stock plans disclosed in this prospectus;
- the entry into an agreement providing for the issuance by us of shares of common stock or any security convertible into or exercisable for common stock in connection with the acquisition by us or our subsidiary of the securities, business, property or other assets of another person or entity or pursuant to an employee benefit plan assumed by us in connection with such acquisition, and the issuance of any such securities pursuant to any such agreement;
- the entry into an agreement providing for the issuance of shares of common stock or any security convertible into or exercisable for shares of common stock in connection with joint ventures, commercial relationships or other strategic transactions, and the issuance of any such securities pursuant to any such agreement; or
- any shares of common stock issued pursuant to the concurrent private placement;

provided that in the case of the fifth and sixth bullet points above, the aggregate number of shares of common stock or any security convertible into or exercisable for common stock (on an as-converted, as-exercised or as-exchanged basis) that we may sell or issue or agree to sell or issue shall not exceed 5% of the total number of shares of common stock issued and outstanding immediately following this offering and all recipients shall agree to be subject to the restrictions described in the paragraph above.

The representatives, in their sole discretion, may release the common stock and other securities subject to the lock-up agreements described above in whole or in part at any time.

In order to facilitate the offering of the common stock, the underwriters may engage in transactions that stabilize, maintain or otherwise affect the price of the common stock. Specifically, the underwriters may sell more shares than they are obligated to purchase under the underwriting agreement, creating a short position. A short sale is covered if the short position is no greater than the number of shares available for purchase by the underwriters under the over-allotment option. The underwriters can close out a covered short sale by exercising the over-allotment option or purchasing shares in the open market. In determining the source of shares to close out a covered short sale, the underwriters will consider, among other things, the open market price of shares compared to the price available under the over-allotment option. The underwriters may also sell shares in excess of the over-allotment option, creating a naked short position. The underwriters must close out any naked short position by purchasing shares in the open market. 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 after pricing that could adversely affect investors who purchase in this offering. As an additional means of facilitating this offering, the underwriters may bid for, and purchase, shares of common stock in the open market to stabilize the price of the common stock. These activities may raise or maintain the market price of the common stock above independent market levels or prevent or retard a decline in the market price of the common stock. The underwriters are not required to engage in these activities and may end any of these activities at any time.

We and the underwriters have agreed to indemnify each other against certain liabilities, including liabilities under the Securities Act.

A prospectus in electronic format may be made available on websites maintained by one or more underwriters, or selling group members, if any, participating in this offering. The representatives may agree to allocate a number of shares of common stock to underwriters for sale to their online brokerage account holders. Internet distributions will be allocated by the representatives to underwriters that may make Internet distributions on the same basis as other allocations.

The underwriters and their respective affiliates are full service financial institutions engaged in various activities, which may include securities trading, commercial and investment banking, financial advisory, investment management, investment research, principal investment, hedging, financing, and brokerage activities. The underwriters and their respective affiliates may in the future perform various financial advisory and investment banking services for us, for which they may receive customary fees and expenses.

In addition, in the ordinary course of their various business activities, the underwriters and their respective affiliates may make or hold a broad array of investments and actively trade debt and equity securities (or related derivative securities) and financial instruments (including bank loans) for their own account and for the accounts of their customers and may at any time hold long and short positions in such securities and instruments. Such investment and securities activities may involve our securities and instruments. For example, an affiliate of Cowen and Company, LLC, one of the underwriters in this offering, currently holds 912,647 shares of our Series B preferred stock, which was acquired in June 2015 in our private placement of an aggregate of 8,474,574 shares of our Series B preferred stock. The underwriters and their respective affiliates may also make investment recommendations or publish or express independent research views in respect of such securities or instruments and may at any time hold, or recommend to clients that they acquire, long or short positions in such securities and instruments.

Pricing of the Offering

Prior to this offering, there has been no public market for our common stock. The initial public offering price was determined by negotiations between us and the representatives. Among the factors considered in determining the initial public offering price were our future prospects and those of our industry in general, our sales, earnings and certain other financial and operating information in recent periods, and the price-earnings ratios, price-sales ratios, market prices of securities, and certain financial and operating information of companies engaged in activities similar to ours.

Selling Restrictions

Canada

Shares of our common stock 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 shares of our common stock 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 (or, in the case of securities issued or guaranteed by the government of a non-Canadian jurisdiction, section 3A.4) of National Instrument 33-105 Underwriting Conflicts (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.

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") an offer to the public of any shares of our common stock may not

be made in that Relevant Member State, except that an offer to the public in that Relevant Member State of any shares of our common stock may be made at any time under the following exemptions under the Prospectus Directive, if they have been implemented in that Relevant Member State:

(a) to any legal entity which is a qualified investor as defined in the Prospectus Directive;

(b) to fewer than 100 or, if the Relevant Member State has implemented the relevant provision of the 2010 PD Amending Directive, 150, natural or legal persons (other than qualified investors as defined in the Prospectus Directive), as permitted under the Prospectus Directive, subject to obtaining the prior consent of the representatives for any such offer; or

(c) in any other circumstances falling within Article 3(2) of the Prospectus Directive, provided that no such offer of shares of our common stock shall result in a requirement for the publication by us or any underwriter of a prospectus pursuant to Article 3 of the Prospectus Directive.

For the purposes of this provision, the expression an "offer to the public" in relation to any shares of our common stock in any Relevant Member State means the communication in any form and by any means of sufficient information on the terms of the offer and any shares of our common stock to be offered so as to enable an investor to decide to purchase any shares of our common stock, 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 (and amendments thereto, including the 2010 PD Amending Directive, to the extent implemented in the Relevant Member State), and includes any relevant implementing measure in the Relevant Member State, and the expression "2010 PD Amending Directive" means Directive 2010/73/EU.

United Kingdom

Each underwriter has represented and agreed that:

(a) it has only communicated or caused to be communicated and will only communicate or cause to be communicated an invitation or inducement to engage in investment activity (within the meaning of Section 21 of the Financial Services and Markets Act 2000 (FSMA) received by it in connection with the issue or sale of the shares of our common stock in circumstances in which Section 21(1) of the FSMA does not apply to us; and

(b) it has complied and will comply with all applicable provisions of the FSMA with respect to anything done by it in relation to the shares of our common stock in, from or otherwise involving the United Kingdom.

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 (a) to "professional investors" as defined in the Securities and Futures Ordinance (Cap. 571) of Hong Kong and any rules made under that Ordinance; or (b) in other circumstances which do not result in the document being a "prospectus" as defined in the Companies 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 the 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.

Japan

No registration pursuant to Article 4, paragraph 1 of the Financial Instruments and Exchange Law of Japan (Law No. 25 of 1948, as amended) (the "FIEL") has been made or will be made with respect to the solicitation of the application for the acquisition of the shares of our common stock.

Accordingly, the shares of our common stock have not been, directly or indirectly, offered or sold and will not be, directly or indirectly, offered or sold 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 re-sale, directly or indirectly, in Japan or to, or for the benefit of, any resident of Japan except pursuant to an exemption from the registration requirements, and otherwise in compliance with, the FIEL and the other applicable laws and regulations of Japan.

For Qualified Institutional Investors ("QII")

Please note that the solicitation for newly-issued or secondary securities (each as described in Paragraph 2, Article 4 of the FIEL) in relation to the shares of our common stock constitutes either a "QII only private placement" or a "QII only secondary distribution" (each as described in Paragraph 1, Article 23-13 of the FIEL). Disclosure regarding any such solicitation, as is otherwise prescribed in Paragraph 1, Article 4 of the FIEL, has not been made in relation to the shares of our common stock. The shares of our common stock may only be transferred to QIIs.

For Non-QII Investors

Please note that the solicitation for newly-issued or secondary securities (each as described in Paragraph 2, Article 4 of the FIEL) in relation to the shares of our common stock constitutes either a "small number private placement" or a "small number private secondary distribution" (each as is described in Paragraph 4, Article 23-13 of the FIEL). Disclosure regarding any such solicitation, as is otherwise prescribed in Paragraph 1, Article 4 of the FIEL, has not been made in relation to the shares of our common stock. The shares of our common stock may only be transferred en bloc without subdivision to a single investor.

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 our shares may not be circulated or distributed, nor may our 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 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, in each case subject to compliance with conditions set forth in the SFA.

Where our shares are subscribed or purchased under Section 275 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; shares, debentures and units of shares and debentures of that corporation or the beneficiaries' rights and interest (howsoever described) in that trust shall not transferred within six months after that corporation or that trust has acquired the shares under Section 275 of the SFA, except: (1) to an institutional investor (for corporations under Section 274 of the SFA) or to a relevant person defined in Section 275(2) of the SFA, or to any person pursuant to an offer that is made on terms that such shares, debentures and units of shares and debentures of that corporation or such rights and interest in that trust are acquired at a consideration of not less than $200,000 (or its equivalent in a foreign currency) for each transaction, whether such amount is to be paid for in cash or by exchange of securities or other assets, and further for corporations, in accordance with the conditions, specified in Section 275 of the SFA; (2) where no consideration is or will be given for the transfer; or (3) where the transfer is by operation of law.

CONCURRENT PRIVATE PLACEMENT

In June 2015, we entered into a strategic collaboration agreement with Seattle Genetics, Inc., or Seattle Genetics. In connection with entering into that agreement, we entered into a participation agreement (the Participation Agreement) with Seattle Genetics that gives us the right, in our sole discretion, to require Seattle Genetics to participate in a private placement of our common stock concurrent with our initial public offering, up to an aggregate of $5.0 million, or 416,666 shares of common stock, based on the initial public offering price of $12.00 per share, subject to certain conditions. The rights granted under the Participation Agreement will terminate upon the completion of this offering, if not exercised by us.

Pursuant to the Participation Agreement, we have entered into a stock purchase agreement with Seattle Genetics, or the Subscription Agreement, which requires Seattle Genetics to purchase from us, concurrently with this offering in a private placement, $5.0 million of shares of our common stock at a price per share equal to the initial public offering price, subject to the terms and conditions set forth in the Subscription Agreement. The sale of these shares will not be registered under the Securities Act of 1933, as amended, and these shares will be subject to a 180-day lock-up agreement with the underwriters for this offering. The concurrent private placement is subject to certain closing conditions. We will receive the full proceeds from the sale and will not pay any underwriting discounts or commissions with respect to the shares of common stock that are sold in the concurrent private placement. The closing of this offering is not conditioned on the closing of the concurrent private placement.

LEGAL MATTERS

The validity of the shares of common stock offered by this prospectus will be passed upon for us by Goodwin Procter LLP, Boston, Massachusetts. Certain legal matters related to this offering will be passed upon for the underwriters by Ropes & Gray LLP, Boston, Massachusetts.

EXPERTS

The financial statements as of December 31, 2017 and 2016 and for each of the three years in the period ended December 31, 2017 included in this prospectus have been so included in reliance on the report (which contains an explanatory paragraph relating to the Company's requirement for additional financing to fund future operations as described in Note 1 to the consolidated financial statements) of PricewaterhouseCoopers LLP, an independent registered public accounting firm, given on the authority of said firm as experts in auditing and accounting.

WHERE YOU CAN FIND MORE INFORMATION

We have filed with the SEC a registration statement on Form S-1 (File Number 333-223414) under the Securities Act with respect to the common stock we are offering by this prospectus. This prospectus does not contain all of the information included in the registration statement. For further information pertaining to us and our common stock, you should refer to the registration statement and to its exhibits. Whenever we make reference in this prospectus to any of our contracts, agreements or other documents, the references are not necessarily complete, and you should refer to the exhibits attached to the registration statement for copies of the actual contract, agreement or other document.

Upon the closing of the offering, we will be subject to the informational requirements of the Exchange Act and will file annual, quarterly and current reports, proxy statements and other information with the SEC. You can read our SEC filings, including the registration statement, at the SEC's website at www.sec.gov. You may also read and copy any document we file with the SEC at its public reference facility at 100 F Street, N.E., Room 1580, Washington, D.C. 20549. We also maintain a website at www.Unumtx.com. Upon closing of the offering, you may access, free of charge, our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act as soon as reasonably practicable after such material is electronically filed with, or furnished to, the SEC.

You may also obtain copies of the documents at prescribed rates by writing to the Public Reference Section of the SEC at 100 F Street, N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the operation of the public reference facilities.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Stockholders of
Unum Therapeutics Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Unum Therapeutics Inc. and its subsidiary as of December 31, 2017 and 2016, and the related consolidated statements of operations and comprehensive loss, of redeemable convertible preferred stock and stockholders' deficit, and of cash flows for each of the three years in the period ended December 31, 2017, including the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and 2016, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2017 in conformity with accounting principles generally accepted in the United States of America.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's consolidated 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 of these consolidated financial statements 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 consolidated financial statements are free of material misstatement, whether due to error or fraud.

Our audits included performing procedures to assess the risks of material misstatement of the consolidated 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 consolidated 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 consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

Emphasis of Matter

As discussed in Note 1 to the consolidated financial statements, the Company will require additional financing to fund future operations. Management's plans in regard to this matter are also described in Note 1.

/s/ PricewaterhouseCoopers LLP

Boston, Massachusetts
March 2, 2018, except for the effects of the reverse stock split discussed in Note 15 to the consolidated financial statements, as to which the date is March 19, 2018

We have served as the Company's auditor since 2015.

UNUM THERAPEUTICS INC.
CONSOLIDATED BALANCE SHEETS
(In thousands, except share and per share amounts)

	December 31,		Pro Forma December 31,
	2016	2017	2017 (unaudited)
Assets			
Current assets:			
Cash and cash equivalents	$ 41,321	$ 28,270	$ 28,270
Marketable securities	27,187	12,691	12,691
Accounts receivable	928	830	830
Prepaid expenses and other current assets	296	513	513
Restricted cash	—	75	75
Total current assets	69,732	42,379	42,379
Property and equipment, net	4,563	4,108	4,108
Deferred offering costs	—	1,373	1,373
Restricted cash	1,255	1,255	1,255
Total assets	$ 75,550	$ 49,115	$ 49,115
Liabilities, Redeemable Convertible Preferred Stock and Stockholders' Equity (Deficit)			
Current liabilities:			
Accounts payable	$ 1,454	$ 1,346	$ 1,346
Accrued expenses and other current liabilities	1,320	2,953	2,953
Deferred revenue	5,963	6,891	6,891
Total current liabilities	8,737	11,190	11,190
Deferred rent	908	906	906
Deferred revenue, net of current portion	13,517	8,714	8,714
Total liabilities	23,162	20,810	20,810
Commitments and contingencies (Note 12)			
Redeemable convertible preferred stock (Series A and B), $0.001 par value; 20,771,850 shares authorized at December 31, 2016 and 20,791,407 shares authorized at December 31, 2017; 20,771,850 shares issued and outstanding at December 31, 2016 and 2017; liquidation preference of $77,297 at December 31, 2017; no shares issued or outstanding, pro forma at December 31, 2017 (unaudited)	77,086	77,151	—
Stockholders' equity (deficit):			
Common stock, $0.001 par value; 60,000,000 shares authorized at December 31, 2016 and 60,040,000 shares authorized at December 31, 2017; 10,190,228 shares issued and outstanding at December 31, 2016 and 10,201,690 shares issued and outstanding at December 31, 2017; 23,431,052 shares issued and outstanding, pro forma at December 31, 2017 (unaudited)	10	10	23
Additional paid-in capital	1,163	2,499	79,637
Accumulated other comprehensive loss	(24)	(16)	(16)
Accumulated deficit	(25,847)	(51,339)	(51,339)
Total stockholders' equity (deficit)	(24,698)	(48,846)	28,305
Total liabilities, redeemable convertible preferred stock and stockholders' equity (deficit)	$ 75,550	$ 49,115	$ 49,115

The accompanying notes are an integral part of these consolidated financial statements.

UNUM THERAPEUTICS INC.
CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS
(In thousands, except share and per share amounts)

	Year Ended December 31,		
	2015	2016	2017
Collaboration revenue	$ 2,986	$ 6,355	$ 8,360
Operating expenses:			
Research and development	6,852	21,992	29,832
General and administrative	2,726	3,433	4,680
Total operating expenses	9,578	25,425	34,512
Loss from operations	(6,592)	(19,070)	(26,152)
Other income (expense):			
Interest income	—	265	386
Other income, net	—	681	274
Total other income, net	—	946	660
Net loss	(6,592)	(18,124)	(25,492)
Accretion of redeemable convertible preferred stock to redemption value	(43)	(64)	(65)
Net loss attributable to common stockholders	$ (6,635)	$ (18,188)	$ (25,557)
Net loss per share attributable to common stockholders, basic and diluted	$ (0.65)	$ (1.78)	$ (2.51)
Weighted average common shares outstanding, basic and diluted	10,190,228	10,190,228	10,191,807
Pro forma net loss per share attributable to common stockholders, basic and diluted (unaudited)			$ (1.09)
Pro forma weighted average common shares outstanding, basic and diluted (unaudited)			23,421,169
Comprehensive loss:			
Net loss	$ (6,592)	$ (18,124)	$ (25,492)
Other comprehensive income (loss):			
Unrealized gains (losses) on marketable securities, net of tax of $0	—	(24)	8
Comprehensive loss	$ (6,592)	$ (18,148)	$ (25,484)

The accompanying notes are an integral part of these consolidated financial statements.

UNUM THERAPEUTICS INC.
CONSOLIDATED STATEMENTS OF REDEEMABLE CONVERTIBLE PREFERRED STOCK AND STOCKHOLDERS' DEFICIT
(in thousands, except share amounts)

	Redeemable Convertible Preferred Stock		Common Stock		Additional Paid-in Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Total Stockholders' Deficit
	Shares	Amount	Shares	Amount				
Balances at December 31, 2014	6,297,276	$ 6,350	10,190,228	$ 10	$ 6	$ —	$ (1,254)	$ (1,238)
Issuance of Series A redeemable convertible preferred stock, net of $11 of issuance costs	6,000,000	5,989	—	—	—	—	—	—
Issuance of Series B redeemable convertible preferred stock, net of $237 of issuance costs	8,474,574	64,763	—	—	—	—	—	—
Reversal of cumulative dividends	—	(123)	—	—	—	—	123	123
Stock-based compensation expense	—	—	—	—	248	—	—	248
Accretion of redeemable convertible preferred stock to redemption value	—	43	—	—	(43)	—	—	(43)
Net loss	—	—	—	—	—	—	(6,592)	(6,592)
Balances at December 31, 2015	20,771,850	77,022	10,190,228	10	211	—	(7,723)	(7,502)
Stock-based compensation expense	—	—	—	—	1,016	—	—	1,016
Unrealized losses on marketable securities	—	—	—	—	—	(24)	—	(24)
Accretion of redeemable convertible preferred stock to redemption value	—	64	—	—	(64)	—	—	(64)
Net loss	—	—	—	—	—	—	(18,124)	(18,124)
Balances at December 31, 2016	20,771,850	77,086	10,190,228	10	1,163	(24)	(25,847)	(24,698)
Issuance of common stock upon exercise of stock options	—	—	11,462	—	60	—	—	60
Stock-based compensation expense	—	—	—	—	1,341	—	—	1,341
Unrealized gains on marketable securities	—	—	—	—	—	8	—	8
Accretion of redeemable convertible preferred stock to redemption value	—	65	—	—	(65)	—	—	(65)
Net loss	—	—	—	—	—	—	(25,492)	(25,492)
Balances at December 31, 2017	20,771,850	$77,151	10,201,690	$ 10	$ 2,499	$ (16)	$(51,339)	$ (48,846)

The accompanying notes are an integral part of these consolidated financial statements.

UNUM THERAPEUTICS INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)

	Year Ended December 31,		
	2015	2016	2017
Cash flows from operating activities:			
Net loss	$ (6,592)	$ (18,124)	$ (25,492)
Adjustments to reconcile net loss to net cash provided by (used in) operating activities:			
Stock-based compensation expense	248	1,016	1,341
Depreciation and amortization expense	179	830	1,171
Premiums paid on marketable securities	—	(56)	(13)
Net amortization of premiums on marketable securities	—	17	17
Non-cash interest expense	—	—	20
Changes in operating assets and liabilities:			
Accounts receivable	(294)	(634)	98
Prepaid expenses and other current assets	(292)	70	(237)
Accounts payable	705	389	(31)
Accrued expenses and other current liabilities	512	714	1,168
Deferred rent	665	243	(2)
Deferred revenue	22,585	(3,105)	(3,875)
Net cash provided by (used in) operating activities	17,716	(18,640)	(25,835)
Cash flows from investing activities:			
Purchases of property and equipment	(1,994)	(3,307)	(912)
Purchases of marketable securities	—	(55,172)	(6,500)
Maturities and sales of marketable securities	—	28,000	21,000
Changes in restricted cash	(1,255)	50	(75)
Net cash provided by (used in) investing activities	(3,249)	(30,429)	13,513
Cash flows from financing activities:			
Proceeds from issuance of redeemable convertible preferred stock, net of issuance costs	70,752	—	—
Proceeds from issuance of common stock upon exercise of stock options	—	—	60
Payments of initial public offering costs	—	—	(789)
Debt issuance costs	—	(40)	—
Net cash provided by (used in) financing activities	70,752	(40)	(729)
Net increase (decrease) in cash and cash equivalents	85,219	(49,109)	(13,051)
Cash and cash equivalents at beginning of period	5,211	90,430	41,321
Cash and cash equivalents at end of period	$90,430	$ 41,321	$ 28,270
Supplemental disclosure of noncash investing and financing information:			
Purchases of property and equipment included in accounts payable	$ 601	$ 271	$ 75
Deferred offering costs included in accounts payable and accrued expenses	$ —	$ —	$ 584
Accretion of redeemable convertible preferred stock to redemption value	$ 43	$ 64	$ 65

The accompanying notes are an integral part of these consolidated financial statements.

UNUM THERAPEUTICS INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. Nature of the Business and Basis of Presentation

Unum Therapeutics Inc. ("Unum" or the "Company") is a clinical-stage biopharmaceutical company focused on the development and commercialization of novel immunotherapy products designed to harness the power of a patient's immune system to cure cancer. The Company's proprietary technology, called antibody-coupled T cell receptor ("ACTR"), is a universal, engineered cell therapy that is intended to be used in combination with a wide range of tumor-specific antibodies to target different tumor types. Unum was incorporated in March 2014 under the laws of the State of Delaware.

The Company is subject to risks and uncertainties common to early-stage companies in the biotechnology industry, including, but not limited to, development by competitors of new technological innovations, dependence on key personnel, protection of proprietary technology, compliance with government regulations and the ability to secure additional capital to fund operations. Product candidates currently under development will require significant additional research and development efforts, including extensive preclinical and clinical testing and regulatory approval prior to commercialization. These efforts require significant amounts of additional capital, adequate personnel and infrastructure and extensive compliance-reporting capabilities. Even if the Company's drug development efforts are successful, it is uncertain when, if ever, the Company will realize significant revenue from product sales.

The accompanying consolidated financial statements have been prepared on the basis of continuity of operations, realization of assets and the satisfaction of liabilities and commitments in the ordinary course of business. Through December 31, 2017, the Company has funded its operations with the sales of redeemable convertible preferred stock and payments received in connection with a collaboration agreement. Since inception, the Company has incurred recurring losses, including net losses of $6.6 million for the year ended December 31, 2015, $18.1 million for the year ended December 31, 2016 and $25.5 million for the year ended December 31, 2017. As of December 31, 2017, the Company had an accumulated deficit of $51.3 million. The Company expects to continue to generate operating losses in the foreseeable future. As of March 2, 2018, the issuance date of the consolidated financial statements for the year ended December 31, 2017, the Company expects that its cash, cash equivalents and marketable securities, together with $15.0 million of available borrowings under its loan and security agreement, will be sufficient to fund its operating expenses and capital expenditure requirements through at least 12 months from the issuance date of the consolidated financial statements.

The Company is seeking to complete an initial public offering of its common stock. Upon the completion of a qualified public offering on specified terms, the Company's outstanding redeemable convertible preferred stock will automatically convert into shares of common stock (see Note 8).

In the event the Company does not complete an initial public offering, the Company expects to seek additional funding through private equity financings, debt financings, collaborations, strategic alliances and marketing, distribution or licensing arrangements. The Company may not be able to obtain financing on acceptable terms, or at all, and the Company may not be able to enter into collaborations or other arrangements. The terms of any financing may adversely affect the holdings or the rights of the Company's stockholders. If the Company is unable to obtain funding, the Company could be forced to delay, reduce or eliminate some or all of its research and development programs, product portfolio expansion or commercialization efforts, which could adversely affect its business prospects.

Although management continues to pursue these plans, there is no assurance that the Company will be successful in obtaining sufficient funding on terms acceptable to the Company to fund continuing operations, if at all.

The Company's consolidated financial statements have been prepared in conformity with accounting principles generally accepted in the United States of America ("GAAP").

UNUM THERAPEUTICS INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

The accompanying consolidated financial statements include the accounts of the Company and its wholly owned subsidiary. All intercompany accounts and transactions have been eliminated in consolidation.

2. Summary of Significant Accounting Policies

Use of Estimates

The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the reporting periods. Significant estimates and assumptions reflected in these consolidated financial statements include, but are not limited to, revenue recognition, the accrual of research and development expenses, the valuation of common stock and the valuation of stock-based awards. The Company bases its estimates on historical experience, known trends and other market-specific or other relevant factors that it believes to be reasonable under the circumstances. On an ongoing basis, management evaluates its estimates, as there are changes in circumstances, facts and experience. Actual results may differ from those estimates or assumptions.

Unaudited Pro Forma Information

The accompanying unaudited pro forma consolidated balance sheet as of December 31, 2017 has been prepared to give effect to the automatic conversion of all shares of redeemable convertible preferred stock outstanding into 13,229,362 shares of common stock as if the proposed initial public offering had occurred on December 31, 2017.

In the accompanying consolidated statements of operations and comprehensive loss, the unaudited pro forma basic and diluted net loss per share attributable to common stockholders for the year ended December 31, 2017 have been prepared to give effect to the automatic conversion of all shares of redeemable convertible preferred stock outstanding into shares of common stock as if the proposed initial public offering had occurred on the later of January 1, 2017 or the issuance date of the redeemable convertible preferred stock.

Concentrations of Credit Risk and of Significant Suppliers

Financial instruments that potentially expose the Company to concentrations of credit risk consist primarily of cash and cash equivalents. The Company maintains most of its cash and cash equivalents at three accredited financial institutions. The Company does not believe that it is subject to unusual credit risk beyond the normal credit risk associated with commercial banking relationships.

The Company is dependent on third-party vendors for its product candidates. In particular, the Company relies, and expects to continue to rely, on a small number of vendors to manufacture supplies and process its product candidates for its development programs. These programs could be adversely affected by a significant interruption in the manufacturing process.

Deferred Offering Costs

The Company capitalizes certain legal, professional accounting and other third-party fees that are directly associated with in-process equity financings as deferred offering costs until such financings are consummated. After consummation of the equity financing, these costs are recorded in stockholders' equity (deficit) as a reduction of additional paid-in capital generated as a result of the offering. Should the planned equity financing be abandoned, the deferred offering costs will be expensed immediately as a charge to operating expenses in the

consolidated statement of operations and comprehensive loss. As of December 31, 2016, the Company had no deferred offering costs. As of December 31, 2017, the Company recorded $1.4 million of deferred offering costs in contemplation of a planned initial public offering of common stock.

Debt Issuance Costs

The Company capitalizes certain legal and other third-party fees that are directly associated with obtaining access to capital under credit facilities. Debt issuance costs incurred in connection with obtaining access to capital are recorded in prepaid expenses and other current assets and are amortized over the availability period or term of the credit facility. Debt issuance costs related to a recognized debt liability are recorded as a direct reduction of the carrying amount of the debt liability.

Cash Equivalents

The Company considers all highly liquid investments with original maturities of three months or less at the date of purchase to be cash equivalents. Cash equivalents consisted of money market funds at December 31, 2016 and 2017.

Property and Equipment

Property and equipment are stated at cost less accumulated depreciation and amortization. Depreciation and amortization expense is recognized using the straight-line method over the estimated useful life of each asset as follows:

	Estimated Useful Life
Laboratory equipment	5 years
Computer equipment and software	3 years
Furniture and fixtures	5 years
Leasehold improvements	Shorter of life of lease or 10 years

Costs for capital assets not yet placed into service are capitalized as construction-in-progress and depreciated in accordance with the above guidelines once placed into service. Upon retirement or sale, the cost of assets disposed of and the related accumulated depreciation and amortization are removed from the accounts and any resulting gain or loss is included in loss from operations. Expenditures for repairs and maintenance are charged to expense as incurred.

Impairment of Long-Lived Assets

Long-lived assets consist of property and equipment. Long-lived assets to be held and used are tested for recoverability whenever events or changes in business circumstances indicate that the carrying amount of the assets may not be fully recoverable. Factors that the Company considers in deciding when to perform an impairment review include significant underperformance of the business in relation to expectations, significant negative industry or economic trends and significant changes or planned changes in the use of the assets. If an impairment review is performed to evaluate a long-lived asset group for recoverability, the Company compares forecasts of undiscounted cash flows expected to result from the use and eventual disposition of the long-lived asset group to its carrying value. An impairment loss would be recognized in loss from operations when estimated undiscounted future cash flows expected to result from the use of an asset group are less than its carrying amount. The impairment loss would be based on the excess of the carrying value of the impaired asset group over its fair value, determined based on discounted cash flows. The Company did not record any impairment losses on long-lived assets during the years ended December 31, 2015, 2016 or 2017.

UNUM THERAPEUTICS INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Fair Value Measurements

Certain assets and liabilities are carried at fair value under GAAP. Fair value is defined as the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. Valuation techniques used to measure fair value must maximize the use of observable inputs and minimize the use of unobservable inputs. Financial assets and liabilities carried at fair value are to be classified and disclosed in one of the following three levels of the fair value hierarchy, of which the first two are considered observable and the last is considered unobservable:

- Level 1—Quoted prices in active markets for identical assets or liabilities.
- Level 2—Observable inputs (other than Level 1 quoted prices), such as quoted prices in active markets for similar assets or liabilities, quoted prices in markets that are not active for identical or similar assets or liabilities, or other inputs that are observable or can be corroborated by observable market data.
- Level 3—Unobservable inputs that are supported by little or no market activity and that are significant to determining the fair value of the assets or liabilities, including pricing models, discounted cash flow methodologies and similar techniques.

The Company's cash equivalents and marketable securities are carried at fair value, determined according to the fair value hierarchy described above (see Note 3). The carrying values of the Company's accounts receivable, accounts payable and accrued expenses approximate their fair values due to the short-term nature of these liabilities.

Marketable Securities

The Company's marketable securities are classified as available-for-sale and are carried at fair value, with the unrealized gains and losses reported as a component of accumulated other comprehensive income (loss) in stockholders' equity (deficit). Realized gains and losses and declines in value determined to be other than temporary are based on the specific identification method and are included as a component of other income (expense), net in the consolidated statements of operations and comprehensive loss. The Company classifies its marketable securities with maturities beyond one year as short-term, based on their highly liquid nature and because such marketable securities are available for current operations.

The Company evaluates its marketable securities with unrealized losses for other-than-temporary impairment. When assessing marketable securities for other-than-temporary declines in value, the Company considers such factors as, among other things, how significant the decline in value is as a percentage of the original cost, how long the market value of the investment has been less than its original cost, the Company's ability and intent to retain the investment for a period of time sufficient to allow for any anticipated recovery in fair value and market conditions in general. If any adjustment to fair value reflects a decline in the value of the investment that the Company considers to be "other than temporary," the Company reduces the investment to fair value through a charge to the statement of operations and comprehensive loss. No such adjustments were necessary during the periods presented.

Classification and Accretion of Redeemable Convertible Preferred Stock

The Company has classified redeemable convertible preferred stock outside of stockholders' equity (deficit) because the shares contain certain redemption features that are not solely within the control of the Company. The carrying values of the redeemable convertible preferred stock are accreted to their respective redemption values from the date of issuance through the earliest date of redemption.

UNUM THERAPEUTICS INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Segment Information

The Company manages its operations as a single segment for the purposes of assessing performance and making operating decisions. The Company's singular focus is the development and commercialization of immunotherapy products for cancer. All of the Company's tangible assets are held in the United States.

Collaboration Agreements

The Company follows the accounting guidance for collaboration agreements, which requires that certain transactions between the Company and collaborators be recorded in its consolidated statements of operations and comprehensive loss on either a gross basis or net basis, depending on the characteristics of the collaborative relationship, and requires enhanced disclosure of collaborative relationships. The Company evaluates its collaboration agreements for proper classification in its consolidated statements of operations and comprehensive loss based on the nature of the underlying activity. If payments to and from collaborative partners are not within the scope of other authoritative accounting literature, the consolidated statements of operations classification for the payments is based on a reasonable, rational analogy to authoritative accounting literature that is applied in a consistent manner. When the Company has concluded that it has a customer relationship with one of its collaborators, such as that with Seattle Genetics, Inc. (see Note 6), the Company follows the guidance in Accounting Standards Codification ("ASC") Topic 605, *Revenue Recognition* ("ASC 605"). When the Company has concluded that it has a vendor relationship with one of its collaborators, the Company recognizes any reimbursements received from these vendors as a reduction of the related expense incurred, in accordance with ASC 605-50, *Revenue Recognition—Customer Payments and Incentives*.

Revenue Recognition of Collaboration Agreements

The Company recognizes revenue from license and collaboration agreements in accordance with ASC 605. Accordingly, revenue is recognized when all of the following criteria are met: persuasive evidence of an arrangement exists, delivery has occurred or services have been rendered, the seller's price to the buyer is fixed or determinable, and collectibility is reasonably assured.

When evaluating multiple-element arrangements, the Company considers whether the deliverables under the arrangement represent separate units of accounting. This evaluation requires subjective determinations and requires management to make judgments about the individual deliverables and whether such deliverables are separable from the other aspects of the contractual relationship. In determining the units of accounting, management evaluates certain criteria, including whether the deliverables have standalone value, based on the consideration of the relevant facts and circumstances for each arrangement. The consideration to be received under each arrangement is allocated to the separate units of accounting using the relative selling price method, and the applicable revenue recognition criteria are applied to each of the separate units. Deliverables are considered separate units of accounting provided that (i) the delivered item has value to the customer on a standalone basis and (ii) if the arrangement includes a general right of return with respect to the delivered item, delivery or performance of the undelivered items is considered probable and substantially in the Company's control. In assessing whether an item has standalone value, the Company considers factors such as the research, development, manufacturing and commercialization capabilities of the collaboration partner and the availability of the associated expertise in the general marketplace. In addition, the Company considers whether the collaboration partner can use any other deliverable for its intended purpose without the receipt of the remaining deliverables, whether the value of the deliverable is dependent on the undelivered items, and whether there are other vendors that can provide the undelivered items.

The consideration received under the arrangement that is fixed or determinable is then allocated among the separate units of accounting based on the relative selling prices of the separate units of accounting. The Company

determines the selling price of a unit of accounting within each arrangement following the hierarchy of evidence prescribed by ASC 605-25. Accordingly, the Company determines the estimated selling price for units of accounting within each arrangement using vendor-specific objective evidence ("VSOE") of selling price, if available; third-party evidence ("TPE") of selling price, if VSOE is not available; or best estimate of selling price ("BESP"), if neither VSOE nor TPE is available. The Company typically uses BESP to estimate the selling price as it generally does not have VSOE or TPE of selling price for its units of accounting. Determining the BESP for a unit of accounting requires significant judgment. In developing the BESP for a unit of accounting, the Company considers applicable market conditions and relevant entity-specific factors, including factors that were contemplated in negotiating the agreement with the customer and estimated costs. The Company validates the BESP for units of accounting by evaluating whether changes in the key assumptions used to determine the BESP will have a significant effect on the allocation of arrangement consideration between multiple units of accounting.

The Company recognizes arrangement consideration allocated to each unit of accounting when all of the revenue recognition criteria in ASC 605 are met for that particular unit of accounting. In the event that a deliverable does not represent a separate unit of accounting, the Company recognizes revenue from the combined unit of accounting over the contractual or estimated period of performance for the undelivered items, which is typically the term of the Company's research and development obligations. If there is no discernible pattern of performance or objectively measurable performance measures do not exist, then the Company recognizes revenue under the arrangement on a straight-line basis over the period the Company is expected to complete its performance obligations. Conversely, if the pattern of performance over which the service is provided to the customer can be determined at the inception of the arrangement and if objectively measurable performance measures exist, then the Company recognizes revenue under the arrangement using the proportional performance method. Revenue recognized is limited to the lesser of the cumulative amount of payments received or the cumulative amount of revenue earned, as determined using the straight-line method or proportional performance method, as applicable, as of the end of each reporting period.

Significant management judgment is required in determining the level of effort required under an arrangement and the period over which the Company expects to complete its performance obligations under an arrangement. Steering committee services that are not inconsequential or perfunctory and that are determined to be performance obligations are combined with other research services or performance obligations required under an arrangement, if any, in determining the level of effort required in an arrangement and the period over which the Company expects to complete its aggregate performance obligations.

At the inception of an arrangement that includes options for a customer to purchase additional services or products at agreed upon prices in the future, the Company evaluates whether each option is substantive. Factors that the Company considers in evaluating whether an option is substantive include the overall objective of the arrangement, if the exercise of that option represents a separate buying decision, and if the services or products subject to the option are essential to the functionality of the current deliverables. When an option is considered substantive, the Company does not consider the option or item underlying the option to be a deliverable at the inception of the arrangement, and the associated option fees are not included in the allocable arrangement consideration, assuming the option is not priced at a significant and incremental discount. When an option is not considered substantive, the Company would consider the option, including other deliverables contingent upon the exercise of the option, to be a deliverable at the inception of the arrangement and a corresponding amount would be included in the allocable arrangement consideration. In addition, if the price of the option includes a significant incremental discount, the discount inherent in the option price would be included as a deliverable at the inception of the arrangement.

At the inception of an arrangement that includes potential milestone payments, the Company evaluates whether each milestone is substantive and at risk to both parties on the basis of the contingent nature of the

milestone. This evaluation includes an assessment of whether: (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 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 arrangement. The Company evaluates factors such as the scientific, clinical, regulatory, commercial and other risks that must be overcome to achieve the particular milestone and the level of effort and investment required to achieve the particular milestone in making this assessment. There is considerable judgment involved in determining whether a milestone satisfies all of the criteria required to conclude that a milestone is substantive. The Company will recognize revenue in its entirety upon successful accomplishment of any substantive milestones, assuming all other revenue recognition criteria are met. Milestones that are not considered substantive are recognized as earned if there are no remaining performance obligations or over the remaining period of performance, with a cumulative catch-up being recognized for the elapsed portion of the period of performance, assuming all other revenue recognition criteria are met.

To date, the Company has not recorded any substantive milestones because no milestones that meet the required criteria listed above have been identified. Payments for achievement of non-substantive milestones are deferred and recognized as revenue over the estimated period of performance applicable to the collaboration agreement. As these milestones are achieved, the Company will recognize as revenue a portion of the milestone payment that is equal to the percentage of the period of performance completed when the milestone is achieved, multiplied by the amount of the milestone payment, upon achievement of such milestone. The Company will recognize the remaining portion of the milestone payment over the remaining period of performance under either the proportional performance method or on a straight-line basis.

Royalty revenue, if any, is recognized based on contractual terms 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 and, therefore, the Company has not earned any royalty revenue from product sales.

Amounts received prior to satisfying the revenue recognition criteria listed above are recorded as deferred revenue in the accompanying consolidated balance sheets. Amounts expected to be recognized as revenue within 12 months of the balance sheet date are classified as current deferred revenue. Amounts not expected to be recognized as revenue within the following 12 months of the balance sheet date are classified as non-current deferred revenue.

In the event that a collaboration agreement were to be terminated and the Company had no further performance obligations, the Company would recognize as revenue any portion of the 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 Costs

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, stock-based compensation and benefits, facilities costs and laboratory supplies, depreciation, manufacturing expenses and external costs of outside vendors engaged to conduct preclinical development activities and clinical trials as well as the cost of licensing technology.

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. 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.

Research Contract Costs and Accruals

The Company has entered into various research and development contracts with companies both inside and outside of the United States. These agreements are generally cancelable, and related payments are recorded as research and development expenses as incurred. The Company records accruals for estimated ongoing research costs. When evaluating the adequacy of the accrued liabilities, the Company analyzes progress of the studies or trials, including the phase or completion of events, invoices received and contracted costs. Significant judgments and estimates are made in determining the accrued balances at the end of any reporting period. Actual results could differ from the Company's estimates. The Company's historical accrual estimates have not been materially different from the actual costs.

Patent Costs

All patent-related costs incurred in connection with filing and prosecuting patent applications are expensed as incurred due to the uncertainty about the recovery of the expenditure. Amounts incurred are classified as general and administrative expenses.

Stock-Based Compensation

The Company measures all stock-based awards granted to employees and directors based on the fair value on the date of grant using the Black-Scholes option-pricing model. Compensation expense of those awards is recognized over the requisite service period, which is generally the vesting period of the respective award. Generally, the Company issues awards with only service-based vesting conditions and records the expense for these awards using the straight-line method.

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

The Company classifies stock-based compensation expense in its consolidated statements of operations and comprehensive loss in the same manner in which the award recipient's payroll costs are classified or in which the award recipient's service payments are classified.

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, 2016 and 2017, the Company's only element of other comprehensive loss was unrealized gains (losses) on marketable securities. For the year ended December 31, 2015, there was no difference between net loss and comprehensive loss.

Net Income (Loss) per Share

The Company follows the two-class method when computing net income (loss) per share, as the Company has issued shares that meet the definition of participating securities. The two-class method determines net income

(loss) per share for each class of common and participating securities according to dividends declared or accumulated and participation rights in undistributed earnings. The two-class method requires income available to common stockholders for the period to be allocated between common and participating securities based upon their respective rights to receive dividends as if all income for the period had been distributed.

Basic net income (loss) per share attributable to common stockholders is computed by dividing the net income (loss) attributable to common stockholders by the weighted average number of common shares outstanding for the period. Diluted net income (loss) attributable to common stockholders is computed by adjusting net income (loss) attributable to common stockholders to reallocate undistributed earnings based on the potential impact of dilutive securities. Diluted net income (loss) per share attributable to common stockholders is computed by dividing the diluted net income (loss) attributable to common stockholders by the weighted average number of common shares outstanding for the period, including potential dilutive common shares assuming the dilutive effect of common stock equivalents.

The Company's redeemable 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 common shares 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, 2015, 2016 and 2017.

Income Taxes

The Company accounts for income taxes using the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been recognized in the consolidated financial statements or in the Company's tax returns. Deferred tax assets and liabilities are determined on the basis of the differences between the financial statements and tax basis of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to reverse. Changes in deferred tax assets and liabilities are recorded in the provision for income taxes. 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.

The Company accounts for uncertainty in income taxes recognized in the consolidated financial statements by applying a two-step process to determine the amount of tax benefit to be recognized. First, the tax position must be evaluated to determine the likelihood that it will be sustained upon external examination by the taxing authorities. If the tax position is deemed more-likely-than-not to be sustained, the tax position is then assessed to determine the amount of benefit to recognize in the consolidated financial statements. The amount of the benefit that may be recognized is the largest amount that has a greater than 50% likelihood of being realized upon ultimate settlement. The provision for income taxes includes the effects of any resulting tax reserves, or unrecognized tax benefits, that are considered appropriate as well as the related net interest and penalties.

Recently Adopted Accounting Pronouncements

In August 2014, the Financial Accounting Standards Board ("FASB") issued ASU No. 2014-15, *Disclosure of Uncertainties about an Entity's Ability to Continue as a Going Concern* ("ASU 2014-15"). The amendments

in this update explicitly require a company's management to assess an entity's ability to continue as a going concern and to provide related footnote disclosures in certain circumstances. The new standard is effective for annual periods ending after December 15, 2016 and for interim periods thereafter. The Company adopted ASU 2014-15 as of the required effective date of December 31, 2016. This guidance relates to footnote disclosure only, and its adoption had no impact on the Company's financial position, results of operations or cash flows.

In November 2014, the FASB issued ASU No. 2014-16, *Determining Whether the Host Contract in a Hybrid Financial Instrument Issued in the Form of a Share Is More Akin to Debt or to Equity* ("ASU 2014-16"). The guidance requires an entity to determine the nature of the host contract by considering all stated and implied substantive terms and features of the hybrid financial instrument, weighing each term and feature on the basis of the relevant facts and circumstances (commonly referred to as the whole-instrument approach). The Company adopted the standard retrospectively to all periods presented on the required effective date of January 1, 2016, and its adoption had no impact on the Company's financial position, results of operations or cash flows.

In November 2015, the FASB issued ASU No. 2015-17, *Income Taxes (Topic 740): Balance Sheet Classification of Deferred Taxes* ("ASU 2015-17"), which requires deferred tax liabilities and assets to be classified as non-current in the consolidated balance sheet. ASU 2015-17 is required to be adopted for annual periods beginning after December 15, 2016, including interim periods within those fiscal years. The amendment may be applied either prospectively to all deferred tax liabilities and assets or retrospectively to all periods presented. The Company elected to early adopt the standard on January 1, 2016 and has reflected the adoption retrospectively to all periods presented. The adoption of ASU 2015-17 had no impact on the Company's financial position, results of operations or cash flows.

In March 2016, the FASB issued ASU No. 2016-09, *Compensation—Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting* ("ASU 2016-09"). ASU 2016-09 involves several aspects of the accounting for share-based transactions, including the income tax consequences, classification of awards as either equity or liabilities, an option to recognize gross share compensation expense with actual forfeitures recognized as they occur and certain classifications on the statement of cash flows. Certain of these changes are required to be applied retrospectively, while other changes are required to be applied prospectively. The Company adopted ASU 2016-09 as of the required effective date of January 1, 2017 and has elected to account for forfeitures as they occur rather than apply an estimated forfeiture rate to share-based compensation expense. The adoption of ASU 2016-09 had no material impact on the Company's financial position, results of operations or cash flows.

Recently Issued Accounting Pronouncements

In May 2014, the FASB issued ASU No. 2014-09, *Revenue from Contracts with Customers (Topic 606)* ("ASU 2014-09"), which supersedes existing revenue recognition guidance under GAAP. The standard's core principle is that a company will recognize revenue when it transfers promised goods or services to customers in an amount that reflects the consideration to which the company expects to be entitled in exchange for those goods or services. The standard outlines a five-step process to achieve this principle, and will require companies to use more judgment and make more estimates than under the current guidance. The Company expects that these judgments and estimates will include identifying performance obligations in the customer contract, estimating the amount of variable consideration to include in the transaction price and allocating the transaction price to each separate performance obligation. ASU 2014-09 also requires additional disclosure about the nature, amount, timing and uncertainty of revenue and cash flows arising from customer contracts. In August 2015, the FASB issued ASU 2015-14, *Revenue from Contracts with Customers (Topic 606): Deferral of the Effective Date*, which delays the effective date of ASU 2014-09 such that the standard is effective for public entities for annual periods beginning after December 15, 2017 and for interim periods within those fiscal years. The FASB subsequently

issued amendments to ASU No. 2014-09 that have the same effective dates and transition requirements as ASU 2014-09, all of which collectively are herein referred to as “ASC 606”.

The Company has substantially completed its assessment of the impact that ASC 606 will have on its consolidated financial statements. While its assessment is preliminary, the Company expects the adoption will have a material impact on its consolidated financial statements, in particular, related to the pattern and timing of revenue recognition of amounts from its collaboration agreement with Seattle Genetics, Inc. (“Seattle Genetics”) (see Note 6). Under ASC 606, the Company will recognize revenue using the cost-to-cost method, which it believes best depicts the transfer of control to the customer. In contrast, under the existing revenue recognition standard, the Company is recognizing revenue on a straight-line basis over the estimated period of performance. Under the cost-to-cost method, the extent of progress towards completion is measured based on the ratio of actual costs incurred to the total estimated costs expected upon satisfying the identified performance obligation. Under this method, revenue will be recorded as a percentage of the estimated transaction price based on the extent of progress towards completion. In addition, under ASC 606, the estimated transaction price will include variable consideration for payments expected to be earned for preclinical research and clinical development activities through Phase I, which, under the existing standard, the Company was precluded from including in the estimated transaction price until such payments were determinable and due. The estimate of the Company’s measure of progress and estimate of variable consideration to be included in the transaction price will be updated at each reporting date as a change in estimate. The amount of transaction price allocated to the satisfied portion of the performance obligation, based on the Company’s measure of progress, will be recognized immediately on a cumulative catch-up basis, resulting in an adjustment to revenue in the period of change. The amount related to the unsatisfied portion will be recognized as that portion is satisfied over time.

Under ASC 606, the Company will recognize revenue from its collaboration agreement with Seattle Genetics later in the performance period as a result of applying the cost-to-cost method, in contrast to recognizing revenue on a straight-line basis over the estimated 58-month performance period under the existing standard.

The Company currently expects that under ASC 606 it will account for the license, research and development services, and steering committee services as a single performance obligation under the collaboration agreement, just as it accounted for those items as a single unit of accounting under the existing standard. The options held by Seattle Genetics are expected to continue to be accounted for separately as they do not represent material rights based on the criteria of ASC 606. Further, the Company does not expect ASC 606 will have an impact on its current accounting for milestone or royalty payments.

The Company plans to adopt ASC 606 using the modified retrospective transition method, which will result in an adjustment to accumulated deficit in its consolidated balance sheet as of the January 1, 2018 effective date for the cumulative effect of applying the standard. The Company currently expects that the cumulative-effect adjustment will result in an increase in deferred revenue of approximately $6.0 million and a corresponding increase in accumulated deficit, each recorded as of January 1, 2018. As the modified retrospective transition method does not result in a recast of the prior year consolidated financial statements, ASC 606 requires the Company to provide additional disclosures during the year of adoption of the amount by which each financial statement line item is affected by adoption of the new standard and explanations of the reasons for significant changes.

In February 2016, the FASB issued ASU No. 2016-02, *Leases (Topic 842)* (“ASU 2016-02”), which sets out the principles for the recognition, measurement, presentation and disclosure of leases for both parties to a contract (i.e., lessees and lessors). The new standard requires lessees to apply a dual approach, classifying leases as either finance or operating leases based on the principle of whether or not the lease is effectively a financed

purchase by the lessee. This classification will determine whether lease expense is recognized based on an effective interest method or on a straight-line basis over the term of the lease, respectively. A lessee is also required to record a right-of-use asset and a lease liability for all leases with a term of greater than 12 months regardless of their classification. Leases with a term of 12 months or less will be accounted for similar to existing guidance for operating leases today. The guidance is effective for public entities for annual reporting periods beginning after December 15, 2018 and for interim periods within those fiscal years, and early adoption is permitted. The Company is currently evaluating the impact that the adoption of ASU 2016-02 will have on its consolidated financial statements.

In August 2016, the FASB issued ASU No. 2016-15, *Statement of Cash Flows: Classification of Certain Cash Receipts and Cash Payments* ("ASU 2016-15"), to address diversity in practice in how certain cash receipts and cash payments are presented and classified in the statement of cash flows. The standard is effective for annual periods beginning after December 15, 2017, including interim periods within those fiscal years. The Company is currently evaluating the impact that the adoption of ASU 2016-15 will have on its consolidated financial statements.

In November 2016, the FASB issued ASU No. 2016-18, *Statement of Cash Flows (Topic 230)* ("ASU 2016-18"), which requires that amounts generally described as restricted cash and restricted cash equivalents should be included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the statement of cash flows. ASU 2016-18 is effective for fiscal years beginning after December 15, 2017 and interim periods within those fiscal years and should be applied using a retrospective transition method to each period presented. Early adoption is permitted. Upon adoption in 2018, the amount of cash and cash equivalents previously presented on the consolidated statements of cash flows for the years ended December 31, 2016 and 2017 will increase by $1.3 million and $1.3 million, respectively, to reflect the inclusion of restricted cash. Additionally, transfers between restricted and unrestricted cash will no longer be presented as a component of the Company's investing or financing activities.

In May 2017, the FASB issued ASU No. 2017-09, *Compensation—Stock Compensation (Topic 718): Scope of Modification Accounting* ("ASU 2017-09"), which clarifies when to account for a change to the terms or conditions of a share-based payment award as a modification. Under the new guidance, modification accounting is required only if the fair value, the vesting conditions, or the classification of the award (as equity or liability) changes as a result of the change in terms or conditions. The standard is effective for annual periods beginning after December 15, 2017, including interim periods within those fiscal years. Early adoption is permitted. The Company is currently evaluating the impact that the adoption of ASU 2017-09 will have on its consolidated financial statements. The Company does not expect that the adoption of ASU 2017-09 will have a material impact on its financial position, results of operations or cash flows

In July 2017, the FASB issued ASU No. 2017-11, *Earnings Per Share (Topic 260), Distinguishing Liabilities from Equity (Topic 480), Derivatives and Hedging (Topic 815) I. Accounting for Certain Financial Instruments with Down Round Features II. Replacement of the Indefinite Deferral for Mandatorily Redeemable Financial Instruments of Certain Nonpublic Entities and Certain Mandatorily Redeemable Noncontrolling Interests with a Scope Exception* ("ASU 2017-11"). Part I applies to entities that issue financial instruments such as warrants, convertible debt or convertible preferred stock that contain down-round features. Part II replaces the indefinite deferral for certain mandatorily redeemable noncontrolling interests and mandatorily redeemable financial instruments of nonpublic entities contained within ASC Topic 480 with a scope exception and does not impact the accounting for these mandatorily redeemable instruments. ASU 2017-11 is required to be adopted for annual periods beginning after December 15, 2018, including interim periods within those fiscal years. The Company is currently evaluating the impact that the adoption of ASU 2017-11 will have on its consolidated financial statements.

UNUM THERAPEUTICS INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

3. Marketable Securities and Fair Value Measurements

Marketable securities by security type consisted of the following (in thousands):

	December 31, 2016			
	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
U.S. Treasury notes (due within one year)	$ 17,000	$ 2	$ (6)	$16,996
U.S. Treasury notes (due after one year through two years)	2,510	—	(11)	2,499
U.S. government agency bonds (due after one year through two years)	7,701	—	(9)	7,692
	$ 27,211	$ 2	$ (26)	$27,187

	December 31, 2017			
	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
U.S. Treasury notes (due within one year)	$ 5,007	$ —	$ (10)	$ 4,997
U.S. government agency bonds (due within one year)	7,700	—	(6)	7,694
	$ 12,707	$ —	$ (16)	$12,691

The following tables present the Company's fair value hierarchy for its cash equivalents and marketable securities, which are measured at fair value on a recurring basis (in thousands):

	Fair Value Measurements at December 31, 2016 Using:			
	Level 1	Level 2	Level 3	Total
Cash equivalents:				
Money market funds	$ —	$ 32,980	$ —	$ 32,980
Marketable securities:				
U.S. Treasury notes	19,495	—	—	19,495
U.S. government agency bonds	—	7,692	—	7,692
	$ 19,495	$ 40,672	$ —	$ 60,167

	Fair Value Measurements at December 31, 2017 Using:			
	Level 1	Level 2	Level 3	Total
Cash equivalents:				
Money market funds	$ —	$ 24,196	$ —	$ 24,196
Marketable securities:				
U.S. Treasury notes	4,997	—	—	4,997
U.S. government agency bonds	—	7,694	—	7,694
	$ 4,997	$ 31,890	$ —	$ 36,887

U.S. Treasury notes were valued based on Level 1 inputs. Money market funds and U.S. government agency bonds were valued by the Company using quoted prices in active markets for similar securities, which represent a Level 2 measurement within the fair value hierarchy.

During the years ended December 31, 2016 and 2017, there were no transfers between Level 1, Level 2 and Level 3.

UNUM THERAPEUTICS INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

4. Property and Equipment, Net

Property and equipment, net consisted of the following (in thousands):

	December 31,	
	2016	2017
Laboratory equipment	$ 4,628	$ 5,327
Computer equipment and software	201	218
Furniture and fixtures	317	317
Leasehold improvements	426	426
	5,572	6,288
Less: Accumulated depreciation and amortization	(1,009)	(2,180)
	$ 4,563	$ 4,108

Depreciation and amortization expense was $0.2 million, $0.8 million and $1.2 million for the years ended December 31, 2015, 2016 and 2017, respectively.

5. Accrued Expenses and Other Current Liabilities

Accrued expenses and other current liabilities consisted of the following (in thousands):

	December 31,	
	2016	2017
Accrued employee compensation and benefits	$1,202	$1,315
Accrued professional fees	—	980
Accrued external research and development expenses	—	478
Other	118	180
	$1,320	$2,953

6. Collaboration Agreement

In June 2015, the Company entered into a collaboration agreement with Seattle Genetics whereby the parties agreed to jointly develop two product candidates incorporating the Company's ACTR platform and Seattle Genetics' antibodies. The Company received an upfront payment of $25.0 million and an equity investment of $5.0 million, with terms consistent with those of other investors that purchased Series B redeemable convertible preferred stock in June 2015 (see Note 8). These shares of Series B redeemable convertible preferred stock were issued at a price of $7.67 per share, which was determined to be fair value based on the same price paid by other new and existing investors that purchased $60.0 million of the $65.0 million of Series B redeemable convertible preferred stock sold in the financing. The equity investment of $5.0 million was considered to be distinct from the collaboration agreement. The agreement included an option, held by Seattle Genetics, to expand the collaboration to include a third product candidate upon payment of an additional fee. This option expired unexercised in June 2017.

Under the agreement, the Company will conduct preclinical research and clinical development activities related to the two specified product candidates through Phase I clinical development, and Seattle Genetics will provide all of the funding for those activities. Seattle Genetics will continue development activities of the two specified product candidates in collaboration with the Company unless it exercises one of its two options to opt-

out from further development and commercialization activities for each of the two product candidates during specified periods subsequent to Phase I clinical development. In addition, the Company has an option to opt-out from further development and commercialization activities for each of the two product candidates, exercisable during a specified period subsequent to Phase II clinical development. If neither party exercises its options to opt-out from further development and commercialization activities for each product candidate, the parties will work together to co-develop and fund each product candidate after Phase I clinical development and Seattle Genetics will pay the Company specified collaboration and milestone payments upon the occurrence of specified events related to each product candidate. As of December 31, 2017, the Company was eligible to receive future collaboration and milestone payments under the collaboration agreement of up to an aggregate of $400.0 million across the two active product candidates, consisting of $100.0 million of aggregate collaboration payments, $100.0 million of aggregate regulatory milestone payments and $200.0 million of aggregate commercial milestone payments. The individual collaboration payments are payable upon the occurrence of specified clinical development events and range up to $30.0 million per product candidate. The individual regulatory milestone payments are payable upon the first regulatory approval of each product in the United States and the first regulatory approval of each product in specified territories outside the United States and range up to $35.0 million per product. The individual commercial milestone payments are payable upon the achievement of specified aggregate annual net sales for each product and range up to $60.0 million per product.

In the event that a party exercises its option to opt-out from further development and commercialization of a product candidate, the parties will negotiate in good faith the payment obligations of the continuing party to the opt-out party for that product candidate. Unless either party exercises its right to opt-out from further development and commercialization activities, the Company and Seattle Genetics will co-commercialize and share profits and losses equally on any co-developed products in the United States. Seattle Genetics will retain exclusive commercial rights outside of the United States and is obligated to pay the Company tiered royalties ranging in the high single-digit to mid-teens percentages based on net sales outside of the United States. The royalties are payable on a product-by-product basis and may be reduced in specified circumstances. Seattle Genetics will purchase ACTR T cells from the Company on a cost-plus basis for its commercial supply outside of the United States.

Unless earlier terminated, the collaboration agreement will expire on a product-by-product basis in the United States on the date on which neither party is researching, developing or commercializing such product. Outside of the United States, the collaboration agreement will expire on a product-by-product and country-by-country basis at the end of the applicable royalty term for such product in such country. The royalty term will be in effect beginning at the first commercial sale of a product and ending upon the later to incur of (i) expiration of the last valid claim within any patent right that the Company or Seattle Genetics has that would be infringed by the manufacture, use, sale, offer for sale, or importation of such product in such country, (ii) the end of any regulatory exclusivity periods that apply to the manufacture, use, sale, offer for sale, or importation of such product in such country, or (iii) ten years from the first commercial sale of such product in such country.

The Company analyzed this multiple-element arrangement in accordance with ASC 605 and evaluated whether the performance obligations under this agreement, including the license, research and development services, steering committee participation, and manufacturing services should be accounted for as a single unit or multiple units of accounting. Because of the risk associated with obtaining approval for commercial sale in the Seattle Genetics territories, manufacturing services associated with commercial supply were considered a contingent deliverable and will be accounted for if and when performed. At the inception of the arrangement, the Company determined that the license, research and development services, and steering committee services did not have standalone value to Seattle Genetics and, therefore, represented a single unit of accounting. As of the inception of the arrangement, the Company could not reasonably estimate the level of effort required to fulfill its obligations and, therefore, concluded to recognize the upfront payment and other payments associated with these

deliverables as revenue on a straight-line basis over the estimated period of performance, which is the term of its preclinical research and clinical development activities related to the two specified product candidates through Phase I clinical development. The Company is recognizing the $25.0 million upfront payment as revenue on a straight-line basis over the estimated period of performance. As payments from Seattle Genetics are earned related to the Company's preclinical research and clinical development activities through Phase I clinical development, the Company recognizes as revenue the portion of the payments equal to the percentage of the elapsed research and development term to the total estimated research and development term, with the remaining portion of consideration received being recognized over the remaining estimated period of performance on a straight-line basis. The Company's initial estimate of the period of performance was approximately 58 months, which as of December 31, 2017 had not changed.

Any future milestone payments will be recognized, along with the other arrangement consideration, over the remaining estimated period of performance, if any, beginning at the time a milestone payment is earned, with a cumulative catch up being recognized for the elapsed portion of the estimated research term.

At the inception of the arrangement, the Company evaluated the separate options held by Seattle Genetics (i) to expand the collaboration to include a third product candidate upon payment of an additional fee and (ii) to continue development activities beyond Phase I clinical development activities and determined that each option was substantive. Each option represents a separate buying decision by Seattle Genetics, is not essential to the functionality of the current deliverables, and was not offered at a substantially discounted price. As each option was deemed to be substantive, the item underlying the option was not considered to be a deliverable at the inception of the arrangement and the incremental fees associated with each option were not included in the initial arrangement consideration. These options will be accounted for as separate units of accounting when, and if, such options are exercised by Seattle Genetics.

Under the collaboration agreement, the Company recognized revenue of $3.0 million, $6.4 million and $8.4 million for the years ended December 31, 2015, 2016 and 2017, respectively. As of December 31, 2016 and 2017, deferred revenue of $19.5 million and $15.6 million, respectively, was recorded related to this agreement.

7. Loan and Security Agreement

In January 2017, the Company entered into a loan and security agreement with a lender, which provides for term loan borrowings of up to $15.0 million through January 19, 2019. Borrowings under the loan and security agreement bear interest at a variable annual rate equal to the greater of (i) the prime rate plus 0.25% or (ii) 3.75%, and are payable over an interest-only period until January 19, 2019, followed by a 24-month period of equal monthly payments of principal and interest. All amounts outstanding as of the maturity date of January 19, 2021 become immediately due and payable.

In connection with the loan and security agreement, the Company agreed to enter into warrant agreements with the lender pursuant to which warrants will be issued to purchase a number of shares of the Company's capital stock equal to 1% of the amount of each term loan borrowing under the loan and security agreement, divided by the applicable exercise price.

No amounts have been borrowed as term loans under the loan and security agreement as of December 31, 2017.

Borrowings under the loan and security agreement are collateralized by substantially all of the Company's assets, except for its intellectual property. Under the loan and security agreement, the Company has agreed to affirmative and negative covenants to which it will remain subject until maturity. These covenants include

limitations on the Company's ability to incur additional indebtedness and engage in certain fundamental business transactions, such as mergers or acquisitions of other businesses. There are no financial covenants associated with the loan and security agreement. Events of default under the loan and security agreement include failure to make payments when due, insolvency events, failure to comply with covenants and material adverse effects with respect to the Company.

8. Redeemable Convertible Preferred Stock

The Company has issued Series A redeemable convertible preferred stock (the "Series A preferred stock") and Series B redeemable convertible preferred stock (the "Series B preferred stock"). The Series A preferred stock and the Series B preferred stock are collectively referred to as the "Preferred Stock".

In October 2014, the Company issued and sold 6,297,276 shares of Series A preferred stock, consisting of (i) 6,000,000 shares sold at a price of $1.00 per share for cash proceeds of $5.9 million, net of issuance costs of $0.1 million, and (ii) 297,276 shares issued upon the conversion of $0.3 million of principal and accrued interest on a convertible promissory note. In connection with this issuance and sale of Series A preferred stock, the purchasers of Series A preferred stock also agreed to purchase an aggregate of 6,000,000 shares of Series A preferred stock at a price of $1.00 per share upon the Company achieving specified development milestones. In 2015, the milestones were met and, in April 2015, the Company issued and sold 6,000,000 shares of Series A preferred stock at a price of $1.00 per share to these existing investors for proceeds of $6.0 million, net of issuance costs of less than $0.1 million. The Company determined that the future tranche obligation of the Series A preferred stock purchase agreement did not meet the definition of a freestanding financial instrument because, while separately exercisable, it was not legally detachable. Further, the Company determined that the embedded future tranche obligation did not require bifurcation for accounting purposes as it was clearly and closely related to the economic characteristics and risks of the initial preferred shares and would not meet the definition of a derivative on a standalone basis.

In June 2015, the Company issued and sold 8,474,574 shares of Series B preferred stock at a price of $7.67 per share for proceeds of $64.8 million, net of issuance costs of $0.2 million. In connection with the issuance and sale of Series B preferred stock, the Company amended its certificate of incorporation and the Series A preferred stockholders' rights to receive cumulative dividends was eliminated. The carrying value of the Series A was reduced by the accumulated dividend of $0.1 million, with a corresponding decrease to accumulated deficit.

Upon issuance of each class of Preferred Stock, the Company assessed the embedded conversion and liquidation features of the securities and determined that such features did not require the Company to separately account for these features. The Company also concluded that no beneficial conversion feature existed upon the issuance date of each class of Preferred Stock or as of December 31, 2016 or 2017.

UNUM THERAPEUTICS INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

As of each balance sheet date, the Preferred Stock consisted of the following (in thousands, except share amounts):

	December 31, 2016				
	Preferred Stock Authorized	Preferred Stock Issued and Outstanding	Carrying Value	Liquidation Preference	Common Stock Issuable Upon Conversion
Series A preferred stock	12,297,276	12,297,276	$12,250	$ 12,297	7,832,001
Series B preferred stock	8,474,574	8,474,574	64,836	65,000	5,397,361
	20,771,850	20,771,850	$77,086	$ 77,297	13,229,362

	December 31, 2017				
	Preferred Stock Authorized	Preferred Stock Issued and Outstanding	Carrying Value	Liquidation Preference	Common Stock Issuable Upon Conversion
Series A preferred stock	12,297,276	12,297,276	$12,267	$ 12,297	7,832,001
Series B preferred stock	8,494,131	8,474,574	64,884	65,000	5,397,361
	20,791,407	20,771,850	$77,151	$ 77,297	13,229,362

The holders of the Preferred Stock have the following rights and preferences:

Voting

The holders of Preferred Stock are entitled to vote, together with the holders of common stock, on matters submitted to stockholders for a vote. The holders of Preferred Stock are entitled to the number of votes equal to the number of common shares into which each such share of Preferred Stock could convert. In addition, the holders of Series A preferred stock, voting exclusively and as a separate class, are entitled to elect two directors of the Company. The holders of Series B preferred stock, voting exclusively and as a separate class, are entitled to elect one director of the Company.

Conversion

Each share of Preferred Stock is convertible at the option of the holder at any time after the date of issuance. Each share of Preferred Stock will be automatically converted into shares of common stock at the applicable conversion ratio then in effect upon the closing of a firm commitment public offering with at least $50.0 million of gross proceeds to the Company. Shares of Series A preferred stock will be automatically converted into shares of common stock at the applicable conversion ratio then in effect upon written consent of the holders of at least 65% of the then-outstanding shares of Series A preferred stock. Shares of Series B preferred stock will be automatically converted into shares of common stock at the applicable conversion ratio then in effect upon written consent of the holders of at least a majority of the then-outstanding shares of Series B preferred stock.

The conversion ratio of each series of Preferred Stock is determined by dividing the Original Issue Price of each series by the Conversion Price of each series. The Original Issue Price is $1.00 per share for Series A

preferred stock and $7.67 per share for Series B preferred stock. The Conversion Price at issuance was $1.570131 per share for Series A preferred stock and $12.042908 per share for Series B preferred stock, subject to appropriate adjustment in the event of any stock split, stock dividend, combination or other similar recapitalization and other adjustments as set forth in the Company's certificate of incorporation, as amended and restated.

Dividends

The holders of Preferred Stock are entitled to receive noncumulative dividends if and when declared by the Company's board of directors. The Company may not declare, pay or set aside any dividends on shares of any other series of capital stock of the Company, other than dividends on common stock payable in common stock, unless the holders of the Series A and Series B preferred stock first receive, or simultaneously receive, a dividend on each outstanding share of Series A and Series B preferred stock in an amount at least equal to the greater of (i) $0.08 per share in the case of Series A preferred stock and $0.61 per share in the case of Series B preferred stock, each subject to appropriate adjustment in the event of any stock split, stock dividend, combination or other similar recapitalization with respect to such shares, and (ii) (A) in the case of a dividend on common stock or any class or series of stock that is convertible into common stock, that dividend per share of Preferred Stock as would equal the product of (1) the dividend payable on each share of such class or series determined, if applicable, as if all shares of such class or series had been converted into common stock and (2) the number of shares of common stock issuable upon conversion of each share of Preferred Stock, or (B) in the case of a dividend on any class or series that is not convertible into common stock, at a rate per share of Preferred Stock determined by (1) dividing the amount of the dividend payable on each share of such class or series of capital stock by the Original Issue Price of such class or series of capital stock (subject to appropriate adjustment in the event of any stock dividend, stock split, combination of or other similar recapitalization affecting such shares) and (2) multiplying such fraction by an amount equal to the Original Issue Price of each series of Preferred Stock. If the Company declares, pays or sets aside, on the same date, a dividend on shares of more than one class or series of capital stock of the Company, the dividend payable to the holders of the Preferred Stock shall be calculated based upon the dividend on the class or series of capital stock that would result in the highest Preferred Stock dividend. Stockholders are not entitled to any accruing dividends. No dividends were declared or paid during the years ended December 31, 2015, 2016 or 2017.

Liquidation

In the event of any voluntary or involuntary liquidation, dissolution or winding-up of the Company or Liquidating Event (as described below), the holders of shares of Preferred Stock will receive, in preference to the common stockholders, an amount equal to the greater of (i) the Original Issue Price per share of the respective share of Preferred Stock, plus all dividends declared but unpaid on such shares, or (ii) the amount the holders would receive if the Preferred Stock were converted into common stock prior to such liquidation event. In the event that the assets available for distribution to the Company's stockholders are not sufficient to permit payment to the holders of Preferred Stock in the full amount to which they are entitled, the assets available for distribution will be distributed on a pro rata basis among the holders of the Series A and Series B preferred stock. After the payment of all preferential amounts to the holders of the Preferred Stock then, to the extent available, the remaining assets available for distribution shall be distributed among the holders of the common stock ratably based on the number of shares of common stock held by each holder.

Unless the holders of at least two-thirds of the then-outstanding shares of Preferred Stock, voting together as a single class on an as-converted basis, elect otherwise, a Liquidating Event shall include a merger or consolidation (other than one in which stockholders of the Company own a majority by voting power of the outstanding shares of the surviving or acquiring corporation) or a sale, lease, transfer, exclusive license or other disposition of all or substantially all of the assets of the Company.

Redemption

At any time on or after June 10, 2020, shares of each of the Series A and Series B preferred stock are subject to mandatory redemption by the Company in three equal annual installments beginning 60 days after receipt of a notice of redemption from the holders of at least two-thirds of the combined voting power of the holders of outstanding shares of Series A and Series B preferred stock, voting together as a single class, in an amount equal to the Original Issue Price per share of each series of Preferred Stock plus any dividends declared but unpaid thereon.

9. Common Stock

Each share of common stock entitles the holder to one vote on all matters submitted to a vote of the Company's stockholders. Common stockholders are not entitled to receive dividends, unless declared by the board of directors.

10. Stock-Based Compensation

2015 Stock Incentive Plan

The Company's 2015 Stock Incentive Plan (the "2015 Plan") provides for the Company to grant incentive stock options or nonqualified stock options, restricted stock, restricted stock units and other equity awards to employees, directors and consultants of the Company. The 2015 Plan is administered by the board of directors or, at the discretion of the board of directors, by a committee of the board of directors. The board of directors may also delegate to one or more officers of the Company the power to grant awards to employees and certain officers of the Company. The exercise prices, vesting and other restrictions are determined at the discretion of the board of directors, or its committee if so delegated.

Stock options granted under the 2015 Plan with service-based vesting conditions generally vest over four years and expire after ten years.

The total number of shares of common stock that may be issued under the 2015 Plan was 4,144,876 shares as of December 31, 2017, of which 976,475 shares remained available for future issuance as of December 31, 2017. Shares that are expired, terminated, surrendered or canceled without having been fully exercised will be available for future awards under the 2015 Plan.

The exercise price for stock options granted is not less than the fair value of common shares as determined by the board of directors as of the date of grant. The Company's board of directors values the Company's common stock, taking into consideration its most recently available valuation of common stock performed by third parties as well as additional factors which may have changed since the date of the most recent contemporaneous valuation through the date of grant.

Stock Option Valuation

The fair value of stock option grants is estimated using the Black-Scholes option-pricing model. The Company historically has been a private company and lacks company-specific historical and implied volatility information. Therefore, it estimates its expected stock volatility based on the historical volatility of a publicly traded set of peer companies and expects to continue to do so until such time as it has adequate historical data regarding the volatility of its own traded stock price. For options with service-based vesting conditions, the expected term of the Company's stock options has been determined utilizing the "simplified" method for awards that qualify as "plain-vanilla" options. The expected term of stock options granted to non-employees is equal to

the contractual term of the option award. The risk-free interest rate is determined by reference to the U.S. Treasury yield curve in effect at the time of grant of the award for time periods approximately equal to the expected term of the award. Expected dividend yield is based on the fact that the Company has never paid cash dividends and does not expect to pay any cash dividends in the foreseeable future.

The following table presents, on a weighted average basis, the assumptions used in the Black-Scholes option-pricing model to determine the fair value of stock options granted to employees and directors:

	Year Ended December 31,		
	2015	2016	2017
Risk-free interest rate	1.57%	1.30%	1.81%
Expected volatility	61.72%	72.66%	66.77%
Expected dividend yield	—	—	—
Expected life (in years)	6.21	6.59	6.06

The following table summarizes the Company's option activity since December 31, 2015:

	Number of Shares	Weighted Average Exercise Price	Weighted Average Contractual Term (in years)	Aggregate Intrinsic Value (in thousands)
Outstanding as of December 31, 2015	2,157,339	$ 2.11		
Granted	495,499	5.00		
Exercised	—	—		—
Forfeited	(108,334)	4.04		
Outstanding as of December 31, 2016	2,544,504	$ 2.60	8.59	$ 5,492
Granted	778,342	8.83		
Exercised	(11,462)	5.23		—
Forfeited	(154,445)	5.03		
Outstanding as of December 31, 2017	3,156,939	$ 4.01	8.08	$ 20,734
Vested and expected to vest as of December 31, 2017	3,156,939	$ 4.01	8.08	$ 20,734
Options exercisable as of December 31, 2017	1,546,869	$ 1.98	7.45	$ 13,292

The aggregate intrinsic value of stock options is calculated as the difference between the exercise price of the stock options and the fair value of the Company's common stock for those stock options that had strike prices lower than the fair value of the Company's common stock.

The weighted average grant-date fair value of awards granted during the years ended December 31, 2015, 2016 and 2017 was $1.35 per share, $3.30 per share and $5.39 per share, respectively.

The total fair value of stock options vested during the years ended December 31, 2015, 2016 and 2017 was less than $0.1 million, $0.9 million and $1.2 million, respectively.

As of December 31, 2016 and 2017, there were outstanding unvested service-based stock options held by non-employees for the purchase of 56,797 shares and 37,689 shares, respectively, of common stock.

UNUM THERAPEUTICS INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

The Company recorded stock-based compensation expense in the following expense categories of its consolidated statements of operations and comprehensive loss (in thousands):

	Year Ended December 31,		
	2015	2016	2017
Research and development expenses	$ 145	$ 830	$ 1,159
General and administrative expenses	103	186	182
	$ 248	$ 1,016	$ 1,341

As of December 31, 2017, total unrecognized compensation cost related to the unvested stock-based awards was $6.0 million, which is expected to be recognized over a weighted average period of 3.2 years.

11. Income Taxes

2017 U.S. Tax Reform

On December 22, 2017, the Tax Cuts and Jobs Act (the "TCJA") was signed into United States law. The TCJA includes a number of changes to existing tax law, including, among other things, a permanent reduction in the federal corporate income tax rate from 34% to 21%, effective as of January 1, 2018, as well as 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 tax rate change resulted in (i) a reduction in the gross amount of the Company's deferred tax assets recorded as of December 31, 2017, without an impact on the net amount of its deferred tax assets, which are recorded with a full valuation allowance, and (ii) no income tax expense or benefit being recognized as of the enactment date of the TCJA.

The staff of the Securities and Exchange Commission issued Staff Accounting Bulletin No. 118 to address the application of U.S. GAAP in situations when a registrant does not have the necessary information available, prepared or analyzed (including computations) in reasonable detail to complete the accounting for certain income tax effects of the TCJA. In connection with the initial analysis of the impact of the TCJA, the Company remeasured its deferred tax assets and liabilities based on the rates at which they are expected to reverse in the future, which is generally 21% for federal tax purposes. The remeasurement of the Company's deferred tax assets and liabilities was offset by a change in the valuation allowance.

The Company is still in the process of analyzing the impact to the Company of the TCJA and its analysis is not yet complete. Where the Company has been able to make reasonable estimates of the effects related to the TCJA, the Company has recorded provisional amounts. The ultimate impact to the Company's consolidated financial statements of the TCJA may differ from the provisional amounts.

Income Taxes

During the years ended December 31, 2015, 2016 and 2017, the Company recorded no income tax benefits for the net operating losses incurred or for the research and development tax credits generated in each year due to its uncertainty of realizing a benefit from those items.

UNUM THERAPEUTICS INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

A reconciliation of the U.S. federal statutory income tax rate to the Company's effective income tax rate is as follows:

	Year Ended December 31,		
	2015	2016	2017
Federal statutory income tax rate	(34.0)%	(34.0)%	(34.0)%
State taxes, net of federal benefit	(5.1)	(5.2)	(5.1)
Federal and state research and development tax credits	(4.2)	(6.0)	(7.6)
Federal research and development tax credit add-back	—	—	2.3
Nondeductible items	0.6	1.3	1.3
Tax rate reduction due to Tax Cuts and Jobs Act	—	—	21.9
Increase in deferred tax asset valuation allowance	42.7	43.9	21.2
Effective income tax rate	0.0%	0.0%	0.0%

Net deferred tax assets as of December 31, 2016 and 2017 consisted of the following (in thousands):

	December 31,	
	2016	2017
Deferred tax assets:		
Net operating loss carryforwards	$ 1,741	$ 8,211
Research and development tax credit carryforwards	1,398	3,467
Deferred revenue	6,793	3,693
Accrued expenses	472	491
Capitalized start-up costs	158	102
Capitalized research and development expense	122	73
Other	524	574
Total deferred tax assets	11,208	16,611
Valuation allowance	(11,208)	(16,611)
Net deferred tax assets	$ —	$ —

As of December 31, 2017, the Company had U.S. federal and state net operating loss carryforwards of $29.8 million and $31.0 million, respectively, which may be available to offset future income tax liabilities and begin to expire in 2035. As of December 31, 2017, the Company also had U.S. federal and state research and development tax credit carryforwards of $2.7 million and $1.0 million, respectively, which may be available to offset future income tax liabilities and begin to expire in 2034 and 2029, respectively.

Utilization of the U.S. federal and state net operating loss carryforwards and research and development tax credit carryforwards may be subject to a substantial annual limitation under Section 382 of the Internal Revenue Code of 1986, and corresponding provisions of state law, due to ownership changes that have occurred previously or that could occur in the future. These ownership changes may limit the amount of carryforwards that can be utilized annually to offset future taxable income. In general, an ownership change, as defined by Section 382, results from transactions increasing the ownership of certain stockholders or public groups in the stock of a corporation by more than 50% over a three-year period. The Company has not conducted a study to assess whether a change of control has occurred or whether there have been multiple changes of control since inception due to the significant complexity and cost associated with such a study. If the Company has experienced a change of control, as defined by Section 382, at any time since inception, utilization of the net operating loss carryforwards or research and development tax credit carryforwards would be subject to an annual

limitation under Section 382, 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 limitation may result in expiration of a portion of the net operating loss carryforwards or research and development tax credit carryforwards before utilization. Further, until a study is completed by the Company and any limitation is known, no amounts are being presented as an uncertain tax position.

The Company has evaluated the positive and negative evidence bearing upon its ability to realize the deferred tax assets. Management has considered the Company's history of cumulative net losses incurred since inception and its lack of commercialization of any products or generation of any revenue from product sales since inception and has concluded that it is more likely than not that the Company will not realize the benefits of the deferred tax assets. Accordingly, a full valuation allowance has been established against the deferred tax assets as of December 31, 2016 and 2017. Management reevaluates the positive and negative evidence at each reporting period.

Changes in the valuation allowance for deferred tax assets during the years ended December 31, 2015, 2016 and 2017 related primarily to the increase in net operating loss carryforwards and research and development tax credit carryforwards, partially offset in 2017 by a decrease in deferred tax assets resulting from the decreased federal corporate tax rate, and were as follows (in thousands):

	Year Ended December 31,		
	2015	2016	2017
Valuation allowance as of beginning of year	$ 443	$ 3,254	$11,208
Decreases recorded as benefit to income tax provision	—	—	(5,575)
Increases recorded to income tax provision	2,811	7,954	10,978
Valuation allowance as of end of year	$ 3,254	$11,208	$16,611

As of December 31, 2016 and 2017, the Company had not recorded any amounts for unrecognized tax benefits. The Company files income tax returns in the U.S. and Massachusetts. The statute of limitations for assessment by the Internal Revenue Service and Massachusetts tax authorities remains open for all years since 2014. No federal or state tax audits are currently in process.

12. Commitments and Contingencies

Operating Leases

The Company leases its facility under a non-cancelable operating lease that expires in April 2023. Under the terms of the lease, the Company secured a $1.3 million letter of credit as security for its leased facility. The underlying cash securing this letter of credit has been classified as non-current restricted cash in the accompanying consolidated balance sheets. The lease includes annual rent escalations, which are accrued, such that rent expense is recognized on a straight-line basis over the terms of occupancy.

Future minimum lease payments under the operating lease as of December 31, 2017 are as follows (in thousands):

Year Ending December 31,	
2018	$ 1,826
2019	1,878
2020	1,933
2021	1,989
2022	2,046
Thereafter	689
	$10,361

Rent expense for the years ended December 31, 2015, 2016 and 2017 was $0.7 million, $1.8 million and $1.8 million, respectively.

In December 2015, the Company entered into a 12-month sublease agreement with a tenant for approximately 11,500 square feet of general office and laboratory space at its headquarters. In June 2016, the tenant terminated the sublease and paid the Company $0.5 million, representing the remaining payments due under the sublease. The Company recognized $0.7 million received under the sublease as other income in the consolidated statements of operations and comprehensive loss for the year ended December 31, 2016.

In January 2017, the Company entered into a new 12-month sublease agreement with a tenant for up to 2,500 square feet of general office and laboratory space at its headquarters. The Company recognized $0.3 million received under the sublease as other income in the consolidated statement of operations and comprehensive loss for the year ended December 31, 2017.

License Agreement

In 2014, the Company entered into a license agreement with the National University of Singapore and St. Jude Children's Research Hospital, Inc., collectively referred to as the Licensors, under which it was granted an exclusive, sublicensable, non-transferable license for certain patent rights relating to a chimeric receptor that triggers antibody-dependent cell cytotoxicity in T lymphocytes. The Company is licensing and further developing these patent rights for commercial applications. Per the terms of the license agreement, in 2014, the Company paid a non-refundable license fee upon execution of the agreement and another payment upon the closing of the Series A preferred stock financing, for an aggregate of $0.1 million, which were recognized as research and development expense in the consolidated statement of operations and comprehensive loss.

The Company is obligated to pay license maintenance fees on each anniversary of the effective date of the agreement that escalate from less than $0.1 million for each of the first seven years to $0.1 million on the eighth anniversary and each year thereafter. The Company is also obligated to make aggregate milestone payments of up to 5.5 million Singapore dollars (equivalent to approximately $4.1 million as of December 31, 2017) upon the achievement of specified clinical and regulatory milestones and to pay tiered royalties ranging in the low single-digit percentages on annual net sales of licensed products sold by the Company or its sublicensees. The royalties are payable on a product-by-product and country-by-country basis, and may be reduced in specified circumstances. Additionally, under certain circumstances, the Company is obligated to pay the Licensors a percentage of amounts received from sublicensees.

The license agreement will expire on a country-by-country basis until the last to expire of the patents and patent applications covering such licensed product or service. The Licensors may terminate the license agreement

within 60 days after written notice in the event of a breach of contract. The Licensors may also terminate the agreement upon written notice in the event of our bankruptcy, liquidation, or insolvency. In addition, the Company has the right to terminate this agreement in its entirety at will upon 90 days' advance written notice to the Licensors. However, if the Company has commenced the commercialization of licensed products, the Company can only terminate at will if it ceases all development and commercialization of licensed products.

Manufacturing Commitment

In May 2016, the Company entered into an agreement with a contract manufacturing organization to provide drug product materials. As of December 31, 2017, the Company had committed to non-cancelable minimum purchase commitments totaling $0.2 million over the following 12 months.

Indemnification Agreements

In the ordinary course of business, the Company may provide indemnification of varying scope and terms to vendors, lessors, business partners and other parties with respect to certain matters including, but not limited to, losses arising out of breach of such agreements or from intellectual property infringement claims made by third parties. In addition, the Company has entered into indemnification agreements with members of its board of directors and certain of its executive officers that will require the Company, among other things, to indemnify them against certain liabilities that may arise by reason of their status or service as directors or officers. The maximum potential amount of future payments the Company could be required to make under these indemnification agreements is, in many cases, unlimited. To date, the Company has not incurred any material costs as a result of such indemnifications. The Company does not believe that the outcome of any claims under indemnification arrangements will have a material effect on its financial position, results of operations or cash flows, and it has not accrued any liabilities related to such obligations in its consolidated financial statements as of December 31, 2016 or 2017.

Legal Proceedings

The Company is not currently party to any material legal proceedings. At each reporting date, the Company evaluates whether or not a potential loss amount or a potential range of loss is probable and reasonably estimable under the provisions of the authoritative guidance that addresses accounting for contingencies. The Company expenses as incurred the costs related to such legal proceedings.

UNUM THERAPEUTICS INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

13. Net Loss 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):

	Year Ended December 31,		
	2015	2016	2017
Numerator:			
Net loss	$ (6,592)	$ (18,124)	$ (25,492)
Accretion of redeemable convertible preferred stock to redemption value	(43)	(64)	(65)
Net loss attributable to common stockholders	$ (6,635)	$ (18,188)	$ (25,557)
Denominator:			
Weighted average common shares outstanding, basic and diluted	10,190,228	10,190,228	10,191,807
Net loss per share attributable to common stockholders, basic and diluted	$ (0.65)	$ (1.78)	$ (2.51)

The Company's potential dilutive securities, which include redeemable convertible preferred stock and common stock options, 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 common shares 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 common shares, presented based on amounts outstanding at each period end, from the computation of diluted net loss per share attributable to common stockholders for the periods indicated because including them would have had an anti-dilutive effect:

	Year Ended December 31,		
	2015	2016	2017
Redeemable convertible preferred stock (as converted to common stock)	13,229,362	13,229,362	13,229,362
Stock options to purchase common stock	2,157,339	2,544,504	3,156,939
	15,386,701	15,773,866	16,386,301

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, 2017 has been prepared to give effect to adjustments arising upon the completion of a qualified initial public offering. The unaudited pro forma net loss attributable to common stockholders used in the calculation of unaudited pro forma basic and diluted net loss per share attributable to common stockholders does not include the effects of the accretion of redeemable convertible preferred stock to redemption value because the calculation gives effect to the automatic conversion of all shares of redeemable convertible preferred stock outstanding as of December 31, 2017 into shares of common stock as if the proposed initial public offering had occurred on the later of January 1, 2017 or the issuance date of the redeemable convertible preferred stock.

UNUM THERAPEUTICS INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

The unaudited pro forma basic and diluted weighted average common shares outstanding used in the calculation of unaudited pro forma basic and diluted net loss per share attributable to common stockholders for the year ended December 31, 2017 has been prepared to give effect, upon a qualified initial public offering, to the automatic conversion of all outstanding shares of redeemable convertible preferred stock into common stock as if the proposed initial public offering had occurred on the later of January 1, 2017 or the issuance date of the redeemable convertible preferred stock.

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, 2017 (unaudited)
Numerator:	
Net loss attributable to common stockholders	$ (25,557)
Accretion of redeemable convertible preferred stock to redemption value	65
Pro forma net loss attributable to common stockholders	$ (25,492)
Denominator:	
Weighted average common shares outstanding, basic and diluted	10,191,807
Pro forma adjustment to reflect automatic conversion of redeemable convertible preferred stock into common stock upon the completion of the proposed initial public offering	13,229,362
Pro forma weighted average common shares outstanding, basic and diluted	23,421,169
Pro forma net loss per share attributable to common stockholders, basic and diluted	$ (1.09)

14. Retirement Plan

The Company has a defined-contribution plan under Section 401(k) of the Internal Revenue Code (the "401(k) Plan"). The 401(k) Plan covers all employees who meet defined minimum age and service requirements, and allows participants to defer a portion of their annual compensation on a pre-tax basis. As currently established, the Company is not required to make and to date has not made any contributions to the 401(k) Plan. The Company did not make any matching contributions during the years ended December 31, 2015, 2016 or 2017.

15. Subsequent Events

For its consolidated financial statements as of December 31, 2017 and for the year then ended, the Company evaluated subsequent events through March 2, 2018, the date on which those financial statements were issued, and, with respect to the reverse stock split described below, through March 19, 2018.

Reverse Stock Split

On March 16, 2018, the Company effected a one-for-1.5701314513884 reverse stock split of its issued and outstanding shares of common stock and a proportional adjustment to the existing conversion ratios for each series of the Company's Preferred Stock (see Note 8). Accordingly, all share and per share amounts for all periods presented in the accompanying consolidated financial statements and notes thereto have been adjusted retroactively, where applicable, to reflect this reverse stock split and adjustment of the preferred stock conversion ratios.

UNUM THERAPEUTICS INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

16. Subsequent Events (Unaudited)

2018 Stock Option and Incentive Plan

On March 16, 2018, the Company's stockholders approved the 2018 Stock Option and Incentive Plan (the "2018 Plan"), which will become effective upon the date immediately preceding the date of the effectiveness of the registration statement for the Company's initial public offering. The 2018 Plan provides for the grant of incentive stock options, nonqualified stock options, stock appreciation rights, restricted stock units, restricted stock awards, unrestricted stock awards, cash-based awards and dividend equivalent rights. The number of shares initially reserved for issuance under the 2018 Plan is 2,547,558, plus the shares of common stock remaining available for issuance under the 2015 Plan, which shall be cumulatively increased on January 1, 2019 and each January 1 thereafter by 4% of the number of shares of the Company's common stock outstanding on the immediately preceding December 31 or a lesser number of shares determined by the Company's board of directors. The shares of common stock underlying any awards that are forfeited, canceled, held back upon exercise or settlement of an award to satisfy the exercise price or tax withholding, repurchased or are otherwise terminated by the Company under the 2018 Plan or the 2015 Plan will be added back to the shares of common stock available for issuance under the 2018 Plan.

2018 Employee Stock Purchase Plan

On March 16, 2018, the Company's stockholders approved the 2018 Employee Stock Purchase Plan (the "ESPP"), which will become effective upon the effectiveness of the registration statement for the Company's initial public offering. A total of 314,000 shares of common stock were reserved for issuance under this plan. In addition, the number of shares of common stock that may be issued under the ESPP will automatically increase on January 1, 2019, and each January 1 thereafter through January 1, 2027, by the least of (i) 500,000 shares of common stock, (ii) 1% of the number of shares of the Company's common stock outstanding on the immediately preceding December 31 or (iii) such lesser number of shares as determined by the ESPP administrator.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