2018 Annual Report

April 12, 2019

Dear fellow shareholders,

It is with great pleasure that I write my first letter to my fellow Arvinas shareholders. Twenty years ago, our founder, Dr. Craig Crews, began working on what he originally called a "biochemical parlor trick." Now, we believe targeted protein degradation is one of the most promising areas of medical research.

2018 was a fantastic year for Arvinas. In January, we announced a new partnership with Pfizer. In March, we closed $55M in Series C financing. In October, we completed our initial public offering, which exceeded our expectations and has allowed us to increase our investments in extending our leadership position. By the end of the year, we had received IND approval from the FDA for ARV-110 and presented positive preclinical data for ARV-471 at the San Antonio Breast Cancer Symposium. As we completed these milestones, our team doubled to over 85 colleagues as we continued to build our capabilities and expertise.

We are proud to have led this field since our founding in 2013 and believe we were the first company to advance a targeted protein degrader into human clinical trials in the 1st quarter of 2019 when we initiated our Phase 1 clinical trial of ARV-110, which will evaluate the safety and tolerability of ARV-110 in patients with metastatic castration-resistant prostate cancer and who have progressed on standard of care therapies. This is a major milestone for us, for the field of targeted protein degradation, and potentially for patients with prostate cancer. We expect to move our next therapy, ARV-471, into the clinic in the 3rd quarter of 2019.

These programs are just the beginning for Arvinas. We are exploring new and exciting disease areas, because our PROTAC® technology may be advantageous for many protein targets regardless of therapeutic area, including targets what were previously believed to be "undruggable." We are developing degraders against neurodegenerative targets such as tau, which is implicated in Alzheimer's Disease, and we have engineered targeted PROTAC® protein degraders that have crossed the blood-brain barrier in preclinical studies.

To invest for the future, we have optimized a proprietary library of target ligands, ligase ligands, and linkers that, when combined with computational biological and biophysical data, allows us to rapidly identify and optimize efficient protein degraders with features we believe can make for successful orally bioavailable drugs. We are investing further in developing our platform to maintain our leadership position in the field, including investments in DNA-encoded library screening to identify new target protein ligands and continue to expand the number of ligases we can recruit.

In 2019, we plan to continue reaching our milestones. We expect to begin our Phase 1 trial for ARV-471 in the third quarter, and discuss preliminary clinical data for ARV-110 in the second half of the year. We remain fully committed to excellence in all areas of our work and I am energized by the dedication of our employees and the strength of our programs. It has been my pleasure to lead this incredibly talented and hard-working team.

We truly appreciate our shareholders and your belief in the strength of our platform. We are building the foundation to grow a company that has the potential to change the lives of patients with limited treatment options and across multiple therapeutic areas, and to generate significant value for shareholders in the years to come.

Sincerely,

John Houston

President and Chief Executive Officer

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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

(Mark One)

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2018

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934 FOR THE TRANSITION PERIOD FROM TO .**

Commission File Number: 001-38672

ARVINAS, INC.

(Exact name of registrant as specified in its Charter)

Delaware	**47-2566120**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
5 Science Park **395 Winchester Ave.** **New Haven, Connecticut**	**06511**
(Address of principal executive offices)	**(Zip Code)**

Registrant's telephone number, including area code: (203) 535-1456

Securities registered pursuant to Section 12(b) of the Act:

Common stock, par value $0.001 per share	**Nasdaq Global Select Market**
(Title of each class)	**(Name of each exchange on which registered)**

Securities registered pursuant to Section 12(g) of the Act:

None
(Title of class)

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. YES ☐ NO ☒

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. YES ☐ NO ☒

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. YES ☒ NO ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). YES ☒ NO ☐

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☒

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

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

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☒

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). YES ☐ NO ☒

As of June 30, 2018, the last day of the registrant's most recently completed second fiscal quarter, there was no public market for the registrant's Common Stock. The registrant's Common Stock began trading on the Nasdaq Global Select Market on September 27, 2018. As of March 21, 2019 the aggregate market value of the Common Stock held by non-affiliates of the registrant was approximately $285.3 million, based on the closing price of the registrant's Common Stock on March 21, 2019.The number of shares of registrant's Common Stock, $0.001 par value per share, outstanding as of March 21, 2019 was 32,328,796.

DOCUMENTS INCORPORATED BY REFERENCE

Part III of this Annual Report incorporates by reference information from the definitive Proxy Statement for the registrant's 2019 Annual Meeting of Stockholders, which is expected to be filed with the Securities and Exchange Commission not later than 120 days after the registrant's fiscal year ended December 31, 2018.

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FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains forward-looking statements that involve substantial risks and uncertainties. All statements, other than statements of historical facts, contained in this Annual Report on Form 10-K, including statements regarding our strategy, future operations, future financial position, future revenues, projected costs, prospects, plans and objectives of management, are forward-looking statements. The words "anticipate," "believe," "estimate," "expect," "intend," "may," "might," "plan," "predict," "project," "target," "potential," "goals," "will," "would," "could," "should," "continue" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words.

The forward-looking statements in this Annual Report on Form 10-K include, among other things, statements about:

- the timing of our planned investigational new drug, or IND, submission for ARV-471;
- the timing and conduct of our clinical trial programs of ARV-110 and ARV-471, including statements regarding the timing of initiation and completion of the clinical trials and the period during which the results of the clinical trials will become available;
- the timing of, and our ability to obtain, marketing approval of ARV-110 and ARV-471, and the ability of ARV-110 and ARV-471 and our other product candidates to meet existing or future regulatory standards;
- our plans to pursue research and development of other product candidates;
- the potential advantages of our platform technology and our product candidates;
- the extent to which our scientific approach and platform technology may potentially address a broad range of diseases;
- the potential benefits of our arrangements with Yale University and Professor Crews;
- the timing of and our ability to obtain and maintain regulatory approvals for our product candidates;
- the potential receipt of revenue from future sales of our product candidates;
- the rate and degree of market acceptance and clinical utility of our product candidates;
- our estimates regarding the potential market opportunity for our product candidates;
- our sales, marketing and distribution capabilities and strategy;
- our ability to establish and maintain arrangements for manufacture of our product candidates;
- the potential achievement of milestones and receipt of payments under our collaborations;
- our ability to enter into additional collaborations with third parties;
- our intellectual property position;
- our estimates regarding expenses, future revenues, capital requirements and needs for additional financing;
- the impact of government laws and regulations; and
- our competitive position.

We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements, and you should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements we make. We have included important factors in the cautionary statements included in this Annual Report on Form 10-K, particularly in the "Risk Factors" section, that we believe could cause actual results or events to differ materially from the forward-looking statements that we make. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments we may make.

You should read this Annual Report on Form 10-K and the documents that we have filed as exhibits to this Annual Report on Form 10-K completely and with the understanding that our actual future results may be materially different from what we expect. We do not assume any obligation to update any forward-looking statements except as required by applicable law.

PART I

Item 1. Business.

Overview

We are a biopharmaceutical company dedicated to improving the lives of patients suffering from debilitating and life-threatening diseases through the discovery, development and commercialization of therapies to degrade disease-causing proteins. We use our proprietary technology platform to engineer proteolysis targeting chimeras, or PROTAC targeted protein degraders, that are designed to harness the body's own natural protein disposal system to selectively and efficiently degrade and remove disease-causing proteins. We believe that our targeted protein degradation approach is a new therapeutic modality that may provide distinct advantages over existing modalities, including traditional small molecule therapies and gene-based medicines. Our small molecule PROTAC technology has the potential to address a broad range of intracellular disease targets, including those representing the up to 80% of proteins that cannot be addressed by existing small molecule therapies, commonly referred to as undruggable targets. We are using our PROTAC platform to build an extensive pipeline of protein degradation product candidates to target diseases in a wide range of organ systems and tissues. We are advancing our lead product candidates, ARV-110 and ARV-471, into Phase 1 clinical trials. In March 2019, we initiated a Phase 1 clinical trial for ARV-110 in men with metastatic castration-resistant prostate cancer, or mCRPC, and we expect to initiate a Phase 1 clinical trial for ARV-471 in women with locally advanced or metastatic ER positive / HER2 negative breast cancer in the third quarter of 2019.

We have designed and optimized our proprietary platform for the discovery of PROTAC therapeutics to address diseases caused by abnormal proteins or aberrant protein expression. We engineer our PROTAC targeted protein degraders to tag a target protein for degradation through the ubiquitin proteasome system, one of the cell's natural protein disposal systems, and then to iteratively degrade additional target protein molecules. Our experienced scientific team has developed our PROTAC platform, including a proprietary synthetic PROTAC matrix, to rapidly identify and optimize efficient protein degraders with tunable properties relating to potency, selectivity and method of delivery. We have combined the potential of our PROTAC technology with our specialized knowledge to obtain encouraging preclinical results, successfully degrading more than 90% of all proteins that we have targeted. We have developed PROTAC targeted protein degraders that are capable of being delivered through multiple routes of administration, including oral delivery, as well as PROTAC targeted protein degraders that are able to penetrate the blood brain barrier.

Our two lead product candidates are ARV-110 and ARV-471. We are developing ARV-110, a PROTAC targeted protein degrader targeting the androgen receptor protein, or AR, for the treatment of men with mCRPC. In March 2019, we initiated a Phase 1 trial and we expect to receive preliminary clinical data in the second half of 2019. This Phase 1 trial will assess the safety, tolerability and pharmacokinetics of ARV-110 and also include measures of anti-tumor activity as secondary endpoints, including reduction in prostate specific antigen, or PSA, a well-recognized biomarker of prostate cancer progression. We are developing ARV-471, a PROTAC targeted protein degrader targeting the estrogen receptor protein, or ER, for the treatment of women with locally advanced or metastatic ER positive / HER2 negative breast cancer. We expect to submit an investigational new drug, or IND, application to the U.S. Food and Drug Administration, or FDA, for ARV-471 in the second quarter of 2019, initiate a Phase 1 trial in the third quarter of 2019 and receive preliminary clinical data in 2020. This Phase 1 trial will assess the safety, tolerability and pharmacokinetics of ARV-471 and also include measures of anti-tumor activity as secondary endpoints. In our preclinical studies, these lead product candidates have demonstrated potent and selective protein degradation. We believe favorable clinical trial results in these initial oncology programs would provide validation of our platform as a new therapeutic modality for the potential treatment of diseases caused by dysregulated intracellular proteins regardless of therapeutic area.

In addition to our lead product candidates, we are expanding our pipeline by utilizing our platform to potentially address currently undruggable targets. Unlike existing small molecule inhibitor therapies, our PROTAC targeted protein degraders can degrade proteins using any available binding site, including low-affinity active binding sites or non-functional binding sites, bringing biological utility to ligands that would otherwise be ineffective. While some gene-based medicines are also seeking to address undruggable targets, our PROTAC targeted protein degraders confer the advantages of traditional small molecule therapies, such as broad tissue distribution, multiple routes of administration, including oral delivery, a well-established development pathway and relative ease of manufacturing.

We are further diversifying our pipeline by developing new PROTAC targeted protein degraders against targets for which we believe protein degradation offers advantages to existing therapeutic modalities. For example, we are pursuing targets for the treatment of neurodegenerative diseases, including tauopathies, which are diseases associated with an aggregation of tau proteins in the brain, such as Alzheimer's Disease. We have engineered PROTAC targeted protein degraders that, in preclinical studies, have successfully achieved blood brain barrier penetration, a key step in developing drugs with the potential to treat neurodegenerative targets. We believe there are many other indications for which our PROTAC technology may be advantageous. In an effort to realize the full potential of our PROTAC platform, our ongoing strategic collaborations with Pfizer Inc., or Pfizer, and Genentech, Inc. and F. Hoffman-La Roche Ltd, collectively referred to as Genentech, address targets across multiple therapeutic areas.

We have been a leader in the field of directed protein degradation using chimeric small molecules since our founding in 2013. Our PROTAC technology platform has its origins in work performed at Yale University, or Yale, by our scientific founder and Chief Scientific Advisor, Professor Craig Crews, a leading researcher in the field of protein degradation. We have assembled a scientific team with extensive know-how and translational medicine expertise to develop PROTAC targeted protein degraders with features not previously disclosed in published third-party studies. Our management team draws on extensive experience in all phases of drug discovery and development gained at large pharmaceutical and biotechnology companies to continue to advance our product pipeline and expand the capabilities of our platform. Additionally, Professor Crews continues to provide important scientific guidance and insights to us through ongoing research, consulting and advisory arrangements.

Our Strategy

Our goal is to improve the lives of patients suffering from debilitating and life-threatening diseases through the discovery, development and commercialization of therapies to degrade disease-causing proteins. We believe that our targeted protein degradation approach using our proprietary PROTAC technology is a new therapeutic modality with the potential to provide distinct advantages over existing modalities and to address a broad range of targets, including undruggable targets. The key elements of our strategy are to:

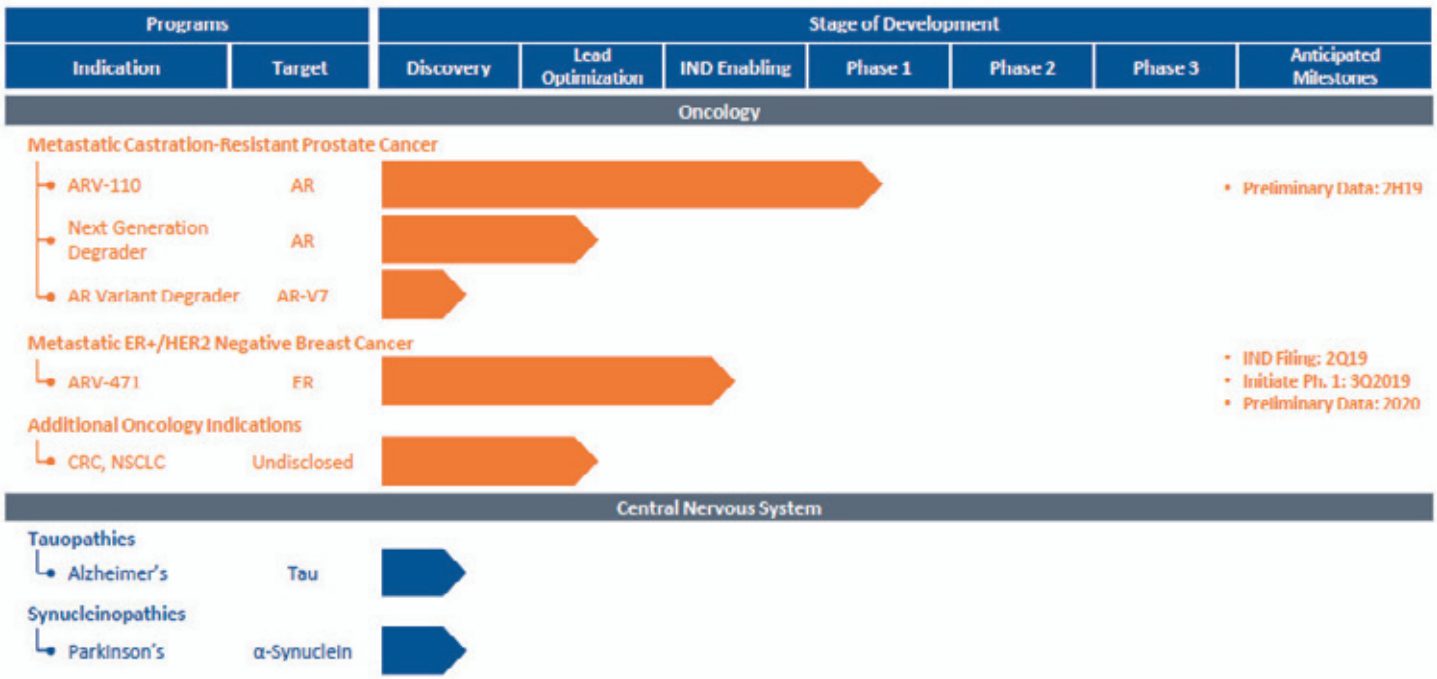
- **Advance clinical development of our lead programs, which address the well-understood oncology targets AR and ER, to validate our PROTAC platform.** Our strategy for our PROTAC platform includes the initial pursuit of oncology targets with well-understood biology, well-characterized disease models and established biomarkers. We initiated a Phase 1 clinical trial for ARV-110 in men with mCRPC in the first quarter of 2019 and we expect to initiate a Phase 1 clinical trial for ARV-471 in women with locally advanced or metastatic ER positive / HER2 negative breast cancer in the third quarter of 2019. We believe favorable clinical trial results in these initial oncology programs would validate the broader therapeutic potential of our PROTAC platform.
- **Utilize our PROTAC platform to address undruggable targets.** We are applying our platform to develop treatments for diseases associated with a prioritized subset of the up to 80% of proteins that cannot be addressed by existing small molecule therapies, commonly referred to as undruggable targets. Our platform enables us to build PROTAC targeted protein degraders with the potential to degrade these proteins through the cell's natural protein degradation process using any available binding site, including low-affinity active binding sites or non-functional binding sites, bringing biological utility to ligands that would otherwise be inactive.
- **Apply our PROTAC platform to develop new therapeutics with distinct advantages over existing modalities, including gene-based medicines.** We intend to address targets for which we believe protein degradation and the tunable features of our PROTAC targeted protein degraders offer advantages compared to existing therapeutic modalities. For example, unlike gene-based medicines, our PROTAC targeted protein degraders confer the advantages of traditional small molecule therapies, such as broad tissue distribution, multiple routes of administration, including oral delivery, a well-established development pathway and relative ease of manufacturing. In addition, we have engineered PROTAC targeted protein degraders that, in preclinical studies, have successfully achieved blood brain barrier penetration, creating potential opportunities for our PROTAC technology in neurodegenerative diseases. We also believe there are many other indications for which our technology may be advantageous, including autoimmune, anti-infective and inflammatory conditions.
- **Continue to expand the capabilities of our PROTAC platform and the breadth of our intellectual property portfolio**. We are committed to continued investment in our research and development activities to expand the capabilities of our PROTAC platform and the breadth of our intellectual property portfolio. This includes: research of E3 ligases, key proteins in the ubiquitin proteasome system, that may have tissue-specific or disease-specific features, and discovery of binding ligands; discovery of additional blood brain barrier penetrant PROTAC targeted protein degraders; and improvement of our PROTAC targeted protein degrader design and optimization processes. In addition to our internal research and development efforts, our agreements with Yale provide us with rights to future discoveries from the laboratory of Professor Crews, our scientific founder and Chief Scientific Advisor. We intend to continue to pursue new scientific and therapeutic insights and PROTAC

targeted protein degrader research to strengthen our position as a leader in protein degradation using chimeric small molecules. We have exclusive worldwide rights to our platform technology, as well as patent applications pending for composition of matter in the United States and key countries for our ARV-110 and ARV-471 product candidates and our exploratory programs. We also have patents and pending patent applications for broad platform coverage for other PROTAC targeted protein degraders using specific E3 ligases.

- **Selectively collaborate to realize the full potential of our platform.** We are building an extensive pipeline of product candidates using our PROTAC platform for which we retain full development and commercialization rights across a wide range of diseases. In an effort to realize the full potential of our PROTAC platform, our ongoing strategic collaborations with Pfizer and Genentech address targets across multiple therapeutic areas. We plan to continue to selectively pursue collaborations with leading biopharmaceutical companies with specialized capabilities or know-how, including development and commercial expertise and capabilities. We believe this selective approach to collaboration will further broaden the therapeutic reach of our PROTAC platform, as well as complement and expand our internal development expertise.

Our Product Pipeline

Our platform has generated several promising degradation product candidates that may be capable of targeting diseases in a wide range of organ systems and tissues. We and our collaborators have initiated programs across multiple therapeutic areas with the goal of developing and delivering life-changing therapies to patients in need. Our lead therapeutic programs, for which we retain full worldwide development and commercialization rights, are summarized in the table below.



We classify our programs as in the discovery stage of development when we are synthesizing and testing PROTAC targeted protein degraders to evaluate degradation of the selected target, differential biology compared to inhibitors, and proof of concept pharmacodynamics and efficacy *in vivo*. A program advances to the lead optimization stage when we have identified a lead PROTAC targeted protein degrader that demonstrates promising activity in *in vitro* and *in vivo* biological models relative to defined criteria. In the lead optimization stage, we are working to optimize the PROTAC targeted protein degraders for a desired profile, including degradation potency, selectivity, drug metabolism and pharmacokinetics, pharmacodynamic activity and *in vivo* efficacy, and we have begun characterizing preclinical tolerability and toxicology. A program enters the IND enabling stage once we are performing studies intended to support the submission of an investigational new drug, or IND, application, including expanded toxicology, drug product optimization and IND documentation preparation.

In addition to the programs above and our early-stage development collaborations with Pfizer and Genentech, we are conducting exploratory research and development work on multiple other undisclosed targets.

Our Focus

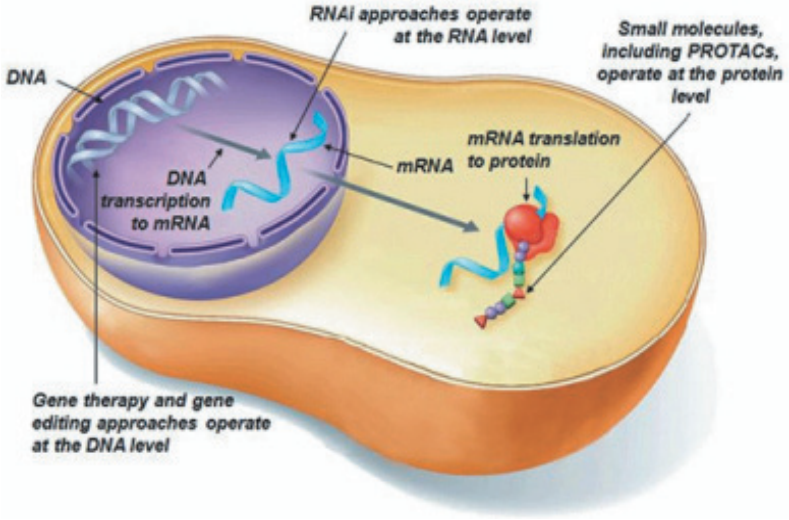
The Role of Proteins in Disease

Human cells produce tens of thousands of different proteins, the entirety of which is referred to as the proteome. Proteins are responsible for many structural, functional and regulatory processes in cells.

Proteins are large, complex biomolecules made through a series of steps based on instructions carried from deoxyribonucleic acid, or DNA, the genetic "blueprint" within the cell. Generally, sequences of DNA are converted into messenger ribonucleic acid, or mRNA, during a process called transcription. mRNA provides the template that specifies the assembly of a particular sequence of amino acids into proteins during a process known as translation. The amino acid sequence dictates, among other things, the conformation, or 3-D shape, of the resulting protein. Proteins can have complex shapes, with multiple chains of amino acids folding together in some cases to reach a final form. The final form of the protein, as well as the timing, location and concentration of its expression within the cell, is essential to the protein's intended function.

In healthy cells, the transcription and translation processes contribute to producing properly folded proteins in the right amounts and at the correct times to ensure normal cell health and function. This balance can be disrupted by a variety of events and factors, such as cellular stress, genetic mutations and transcriptional or translational errors, which can then lead to cellular overexpression, abnormal production rates, misfolding or mutations of proteins. When proteins are overexpressed or mutated, a wide variety of diseases can result. For example, it is well documented that overexpression of androgen receptor, a nuclear hormone receptor, is implicated in prostate cancer. Similarly, overexpression of estrogen receptor is known to be associated with breast cancer. In neurodegenerative diseases, abnormal deposition of misfolded or aggregated proteins in the brain, including the intraneuronal aggregation of the microtubule-associated protein tau, are associated with Alzheimer's Disease. Recent genomic advances continue to implicate the role of specific proteins in many disease states.

There are multiple therapeutic approaches, both approved and in development, to treat diseases caused by abnormal proteins or aberrant protein expression. Each operates at a different point in the lifecycle of the protein, as illustrated in the following graphic:



Small Molecule Inhibitors, Gene Therapy and Gene Editing

Traditional small molecules seek to block or inhibit the expression or function of an errant protein. While there are numerous examples of safe and effective small molecule therapies, their efficacy can be limited by weak or incomplete binding of the therapeutic molecule to the relevant binding site on the protein, the cell's ability to counteract the inhibitory effect of the drug by producing more of the protein, mutation of the target, or evolution of the cell to rely on alternate pathways. These cellular responses often result in a need for higher dosing levels, which can in turn introduce safety challenges from off-target and toxic effects, or drug resistance.

Gene therapy approaches act by augmenting the errant protein with normal protein by using viral vectors to introduce DNA from an exogenous source that codes for a functional protein. While there have been promising advances in this field, including the approval of Luxturna for the treatment of an inherited retinal disease caused by a genetic mutation, the fundamental approach is limited by delivery, expression efficacy, pre-treatment conditioning, durability and manufacturing challenges that curtail the practical utility of gene therapy.

Gene editing or gene silencing approaches such as CRISPR/Cas9, RNA interference and antisense act by either correcting or inactivating, or knocking out, the gene that would otherwise be transcribed and translated to express the errant protein. By correcting or knocking out the gene, the errant protein is never made, preventing its downstream negative effects. In the case of CRISPR/Cas9, the resulting modification of the gene occurs at the DNA level and is believed to be irreversible. While there are examples of approved therapies in this field, such as patisiran for the treatment of the polyneuropathy of hereditary transthyretin-mediated amyloidosis in adults, that have the potential to correct specific genetic defects, gene editing and gene silencing approaches generally face delivery, stability, biodistribution, specificity and selectivity challenges, in addition to significant manufacturing hurdles.

Protein Degradation

When proteins become old, mutated, misfolded or simply have served their purpose, they are naturally degraded by the body through the ubiquitin proteasome system in which cells mark or tag a particular protein for disposal by attaching several molecules of the small regulatory protein ubiquitin to the protein to be disposed. This process generally proceeds along the following steps in rapid sequence:

- The E1 enzyme activates ubiquitin, which is then transferred to an E2 enzyme.
- An E3 ubiquitin ligase, or E3 ligase, transfers the ubiquitin from the E2 enzyme to a specific target protein.
- Once a chain of at least four ubiquitins are attached to the target protein, the proteasome recognizes the polyubiquinated protein.
- The proteasome breaks down or degrades the protein into its amino acid components.

Several therapeutic approaches work at the protein level by modulating the ubiquitin proteasome system to harness the cell's natural protein disposal system to degrade and remove a protein. Degradation can be induced by inhibiting chaperone molecules such as HSP90, which are known to facilitate correct protein folding, resulting in tagging misfolded proteins for degradation. HSP90 inhibitors, however, have shown limited efficacy in the clinic to date.

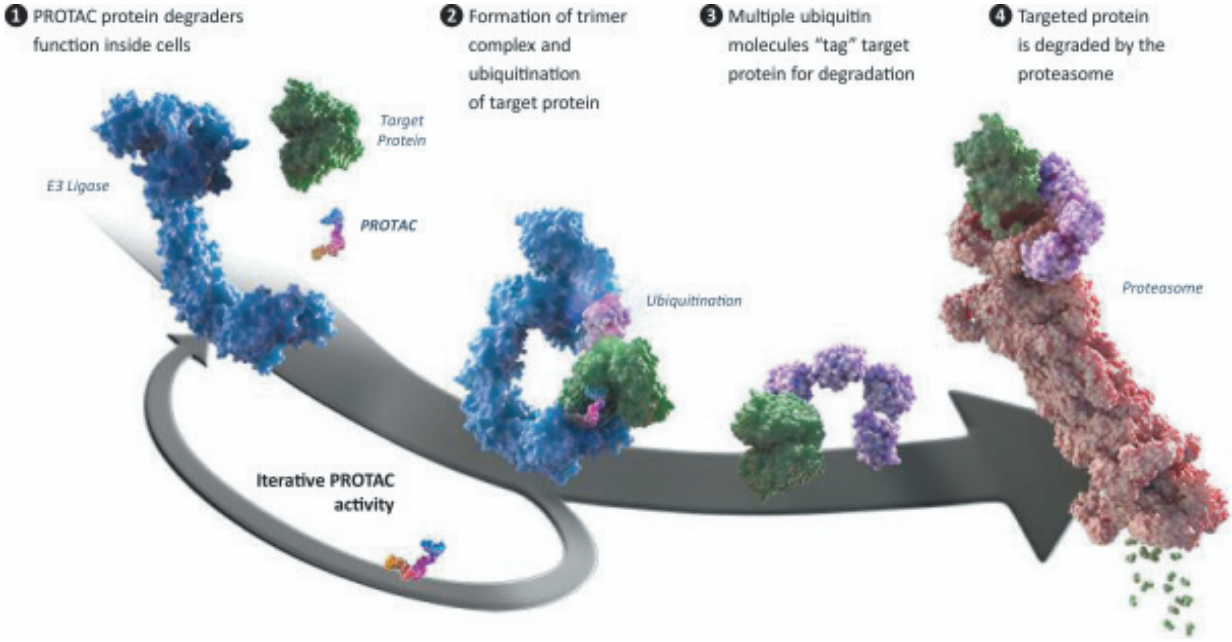
Some degraders use an approach that causes a conformational change in a specifically targeted protein, resulting in a misfolded protein, which triggers the cell's innate protein degradation system to dispose of the misfolded protein. Although these compounds have shown efficacy, they only induce the degradation of those proteins able to adopt a non-native state, leaving a wide array of protein targets unaddressed. The only currently marketed protein degrader utilizing this mechanism, the breast cancer therapy fulvestrant, requires intramuscular administration, further limiting its convenience and pharmacokinetic profile.

Chimeric small molecules use a different protein degradation approach. Instead of causing improper folding or inhibiting molecules that facilitate proper folding of the target protein, chimeric small molecules directly recruit an E3 ligase to tag specifically targeted proteins with ubiquitin, signaling the proteasome to degrade the targeted protein. Our PROTAC targeted protein degraders take this approach to protein degradation.

PROTAC Targeted Protein Degraders —Our Approach to Protein Degradation

We have engineered our PROTAC targeted protein degraders to utilize the cell's naturally occurring protein disposal system, directing the proteasome to recognize and degrade specific proteins associated with disease. Our PROTAC targeted protein degraders are chimeric small molecules with two operative ends—one, a ligand that binds to the protein targeted for degradation, and the other, a ligand that binds to an E3 ligase. These two ligands are connected by a chemical chain linker. Our PROTAC targeted protein degraders bring the targeted protein and the E3 ligase together into a three-component grouping known as a trimer complex to facilitate the transfer of ubiquitin to the target protein. Once four ubiquitins are attached in a chain to the target protein, the proteasome recognizes and degrades the protein. The entire cycle from the formation of the trimer complex, which can occur in a period of nanoseconds, to degradation of the target protein by the proteasome happens over a period of minutes. After our PROTAC targeted protein degrader facilitates the tagging of a target protein molecule with ubiquitin through formation of the trimer complex, it can move on to another target protein molecule to conduct the degradation process again, potentially completing this cycle hundreds of times before eventually being metabolized or eliminated from the cell. We refer to this recycling as our PROTAC targeted protein degraders' iterative mechanism of action.

The figure below depicts our PROTAC-induced cycle from E3 ligase binding and target protein recruitment, to trimer formation and ubiquitin transfer, to degradation of the target protein by the proteasome, to the release of ubiquitin and PROTAC targeted protein degrader for further degradation cycles.



Our Discovery Platform—PROTAC

We have designed and optimized our proprietary platform for the discovery of PROTAC targeted protein degrader therapeutics to address diseases caused by abnormal proteins or aberrant protein expression. We have developed a proprietary synthetic PROTAC matrix which, combined with computational, biological and biophysical data, allows us to rapidly identify and optimize efficient protein degraders with features we believe can make for successful drugs. The modular design and holistic optimization of each PROTAC targeted protein degrader provides us with opportunities to prepare different chemical series, each with tunable properties relating to potency, selectivity and method of delivery, which can produce the efficient trimer complex necessary for degradation of the targeted protein by the proteasome. We have combined the potential of our PROTAC technology with our specialized knowledge to obtain encouraging preclinical results, including successful degradation of over 90% of the more than 30 proteins that we have targeted to date.

Design and Optimization of our PROTAC Targeted Protein Degraders

As genomic knowledge and advances in genome mapping have increased, the understanding of proteins implicated in diseases has similarly increased. We undertake a rigorous evaluation process to prioritize protein targets for which we believe our PROTAC approach can achieve differentiated clinical outcomes for patients over existing modalities. Once we have identified a protein target, we design a modular matrix comprised of directed protein targeting ligands, E3 ligase ligands and chemical linkers to engineer an active PROTAC targeted protein degrader capable of degrading the selected protein.

- **Directed Protein Targeting Ligands**—We select ligands for incorporation into our PROTAC targeted protein degraders from a variety of sources. The ligands we select, which target the desired protein for degradation, may include (1) ***de novo*** ligands discovered through high-throughput screening, biophysical directed binding approaches, virtual or ***in silico*** computer-based screening, and affinity-based hit identification through DNA-encoded libraries or (2) ligands that are known to bind protein targets but may have faced therapeutic limitations that we believe our PROTAC technology can overcome, such as lack of potency or function, metabolic instability or off-target effects.

- **E3 Ligase Ligands**—We currently utilize a group of widely expressed E3 ligases and select ligands from our proprietary library for each of these E3 ligases for incorporation into our PROTAC targeted protein degraders. We are researching additional E3 ligases that are expressed in specific tissues or diseases, and identifying or discovering associated binding ligands, to offer different selectivity profiles that will further advance our PROTAC technology. We believe our success with the diverse set of E3 ligases that we are currently employing and the binders of other E3 ligases that we are researching provide us with a competitive advantage as we develop a range of products with different technical characteristics.
- **Chemical Linkers**—We connect the selected protein-targeting ligands and E3 ligase ligands with our chemical linkers. Linker selection is critical for rapid identification of protein degraders and can introduce function and selectivity to a nonfunctional or nonselective binding ligand upon incorporation into a PROTAC targeted protein degrader molecule. Linker composition can also be used to modulate properties of our PROTAC targeted protein degraders, such as membrane permeability, aqueous solubility, metabolic stability and biodistribution. We select from a proprietary library of conformationally privileged linkers that we have engineered with particular length, flexibility and composition to enable the efficient formation of the trimer complex essential to ubiquitin transfer and protein degradation.

Optimization of traditional small molecule agents tends to focus on guidelines that increase the chances of such molecules having sufficient permeability and solubility to make them orally bioavailable. Chimeric small molecules, including our PROTAC targeted protein degraders, are larger than traditional small molecule therapeutics, such that the conventional optimization parameters prevalent in traditional drug discovery do not readily apply. As such we have developed and apply PROTAC-specific computational, biological and biophysical data for identification and optimization of our PROTAC targeted protein degraders. Our systematic approach and our scientific team's know-how allows us to rapidly progress from target identification to PROTAC optimization and development, and allows us to make PROTAC targeted protein degraders that have properties sufficient to drive potent effects in tumor cells and that are orally bioavailable. Using these principles, we have also made PROTAC targeted protein degraders that can cross the blood brain barrier and are continually building on our understanding of PROTAC targeted protein degraders and seeking ways to improve our platform.

Key Features of Our PROTAC Targeted Protein Degraders

In the design, optimization and development of our PROTAC targeted protein degraders, we focus on the following key features that we believe are critical to successfully engineering PROTAC targeted protein degrader therapeutics with potentially robust application across multiple indications and therapeutic areas: potency, selectivity, and deliverability and versatility. We have harnessed these features to successfully target and degrade a wide range of protein classes, including nuclear proteins, transcription factors, epigenetic modulators, membrane proteins, cytosolic proteins and high molecular weight neuroprotein aggregates.

Potency

The potency of our PROTAC platform is driven by two key characteristics: the iterative mechanism of our PROTAC targeted protein degraders and the ability to turn weak binders into potent degraders.

Iterative Mechanism

Our PROTAC targeted protein degraders behave iteratively to repeatedly induce the ubiquitination and subsequent degradation of proteins. As a result, protein degradation may be observed with PROTAC targeted protein degrader concentrations much lower than those required for typical small molecule inhibition, even operating at picomolar concentrations. We expect that the high cellular potency of PROTAC targeted protein degrader could provide the possibility of removal of proteins at levels equivalent to the knock out effect intended by gene-based medicines currently being explored. Our PROTAC targeted protein degraders offer potentially significant therapeutic advantages, including low doses, low drug exposures and practical dosing intervals, potentially mitigating toxicity and tolerability risks.

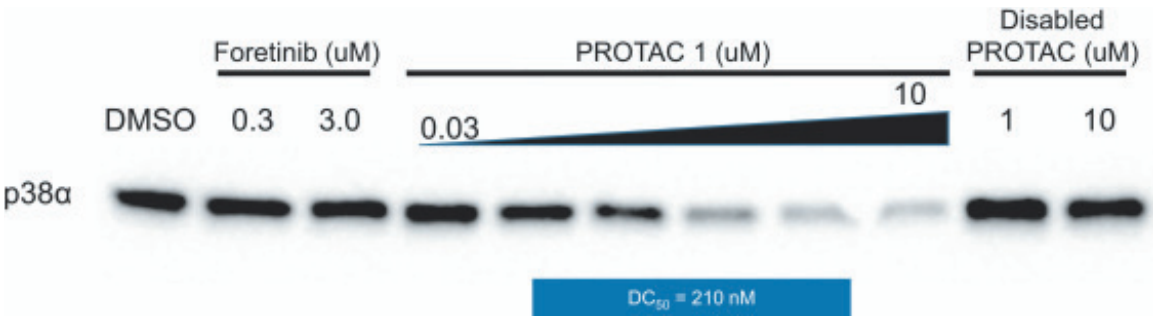
The iterative mechanism of our PROTAC targeted protein degraders potentially leads to more complete and lasting inactivation of downstream signaling in cells. In oncology, this translates into improved inhibition of tumor cell growth and reduces the likelihood of cell compensation through activation of alternative proteins, a common risk associated with small molecule inhibitors. This enables PROTAC targeted protein degraders to operate in a broad therapeutic space between desired degradation-induced pharmacology and unwanted inhibition-induced effects.

Once the pre-existing reservoir of the targeted protein is depleted, our PROTAC targeted protein degraders only need to degrade newly resynthesized protein to maintain their effect. Depending on the resynthesis rate of the protein, this may be achievable with low tissue concentrations of PROTAC targeted protein degrader, which could lead to safety benefits and opportunities for flexible dosing regimens.

Weak Binders Become Potent Degraders

Using our platform and know-how, we are able to engineer potent PROTAC targeted protein degraders that do not require a high degree of binding strength to their targets. This contrasts with small molecule inhibitors, which require strong binding to a target protein and function by continually occupying the protein's active site. The potency of our PROTAC targeted protein degraders is determined by a number of kinetic factors: formation of the trimer complex, rapid ubiquitination, trafficking of the ubiquitinated target to the proteasome and release of the PROTAC targeted protein degrader to enter another iterative cycle of degradation. As a result, a PROTAC targeted protein degrader with a low level of target protein occupancy can maintain a deep and prolonged suppression of protein levels, leading to the desired pharmacological effect. This provides opportunities to use our PROTAC technology to repurpose small molecules that only weakly bind to their target to create potent degraders as PROTAC targeted protein degraders.

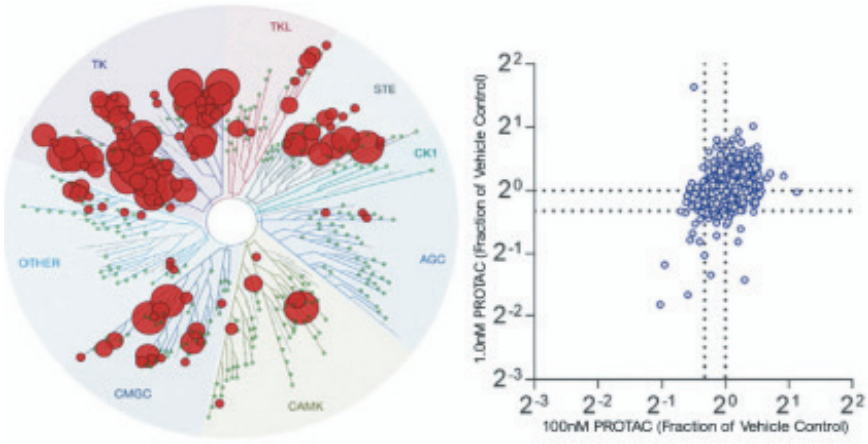
For example, we recently published experiments where we built PROTAC targeted protein degraders from the known protein kinase inhibitor foretinib, which is a relatively weak binder to the protein **p38α**, a protein implicated in immune disorders and heart disease. We constructed a foretinib-based PROTAC targeted protein degrader we refer to as PROTAC 1, which happened to further weaken the binding affinity to **p38α**. Binding affinity is measured by K_D, or equilibrium dissociation constant. In this case, we observed that PROTAC 1 exhibited a tenfold reduction in binding affinity relative to foretinib, decreasing from 1 micromolar, or μM, to 11 μM. Despite the significantly weaker binding affinity, PROTAC 1 achieved potent degradation of **p38α** with a DC_{50}, a concentration that results in half maximal degradation, of 210 nanomolar, or nM, which means that its degradation potency is approximately 50-fold better than its binding strength. The figure below shows a western blot of cells treated with increasing concentrations (left to right) of foretinib, the PROTAC 1, and an inactivated (non-degrading) version of PROTAC 1. The decreasing presence of the **p38α** protein is depicted by a lighter shade of the **p38α** band in the western blot as the doses of the PROTAC 1 increase. This demonstrates our ability to use a weak binder to create a potent PROTAC targeted protein degrader. Based on our experience, we believe that with additional medicinal chemistry effort, the degradation potency of this weak-binding PROTAC targeted protein degrader could be further increased.



Selectivity

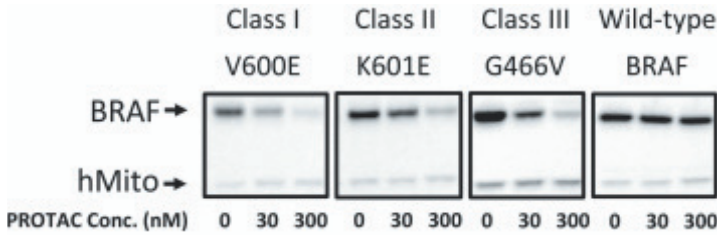
When a ligand is incorporated into a PROTAC targeted protein degrader, the trimer complex initiated by the PROTAC targeted protein degrader often causes the ligand's selectivity to increase, meaning that the degradation profile of a PROTAC targeted protein degrader can be even more selective than the binding profile of the ligand alone. By minimizing the binding of a ligand to off-target proteins and maximizing selectivity for a target protein, our PROTAC targeted protein degraders may reduce the potential for incidental degradation of normal, healthy proteins and unwanted drug effects and toxicity.

We recently published experiments in which a ligand binding to 133 kinases degraded fewer than ten proteins when incorporated into a PROTAC targeted protein degrader with limited additional modification. The figure below on the left depicts foretinib binding to 133 protein kinases as measured by a competitive binding assay. The figure on the right depicts cells treated with a foretinib-based PROTAC targeted protein degrader degrading only a small subset of cellular proteins (lower left quadrant of the graph) as shown by mass spectrometry analysis.



With further modification, and based on our experience, we believe it is possible to engineer promiscuous binders such as this into more selective protein degraders, and when starting with less promiscuous, yet still unselective, binders, identify very selective PROTAC target protein degraders.

This selectivity allows for engineering of PROTAC targeted protein degraders that degrade only the mutated and unwanted protein, while sparing the normal, or wild-type, protein that may be necessary for healthy function. For example, we have demonstrated degradation of abnormal, but not wild-type, forms of the BRAF protein using a PROTAC targeted protein degrader. Wild-type BRAF helps transmit chemical signals from outside the cell to the cell's nucleus and is part of a pathway that regulates cell proliferation, differentiation, migration and apoptosis. Mutations of BRAF, however, have been associated with a number of different cancers. As shown in the figure below, our PROTAC targeted protein degrader degraded BRAF mutants, as depicted by a lighter shade in the columns labeled 300 nM, representative of each of the three classes of BRAF mutations, while not degrading the wild-type BRAF, as depicted by an unchanging shade in each of the columns shown on the western blot.



[1]hMito is a protein this particular PROTAC targeted protein degrader is not targeted to degrade, and is included as a control to ensure total protein is equivalent in each lane.

Deliverability and Versatility

Our PROTAC targeted protein degraders have the potential for delivery through multiple routes of administration to reach target proteins, and certain of our PROTAC targeted protein degraders are capable of penetrating the blood brain barrier. In addition, the broad expression of the E3 ligases we target and the potential to turn weak binding ligands into potent degraders allows the application of our PROTAC technology to develop treatments for diseases associated with proteins that cannot be addressed by existing small molecule therapies.

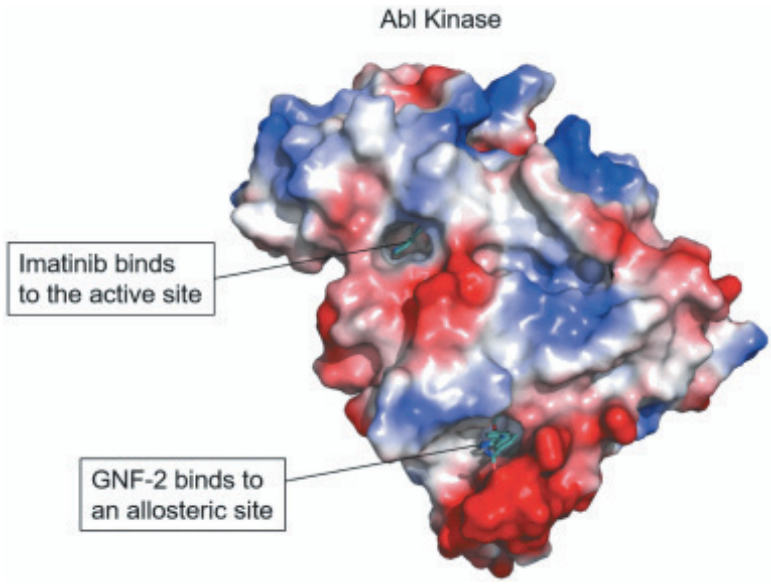
Deliverability

We have developed PROTAC targeted protein degraders that are capable of being delivered orally, intravenously, subcutaneously and intrathecally, among other routes of administration, as well as PROTAC targeted protein degraders that are able to penetrate the blood brain barrier. The multiple routes of delivery for our PROTAC targeted protein degraders potentially provide many attractive clinical dosing options. For example, oral delivery can offer a differentiating, competitive and commercial advantage over other therapeutic approaches such as gene-based medicines that allows for more convenient treatment. Further, oral administration avoids risks of adverse events associated with intravenous or intramuscular administration, such as the potential for infection and blood clots at the infusion site.

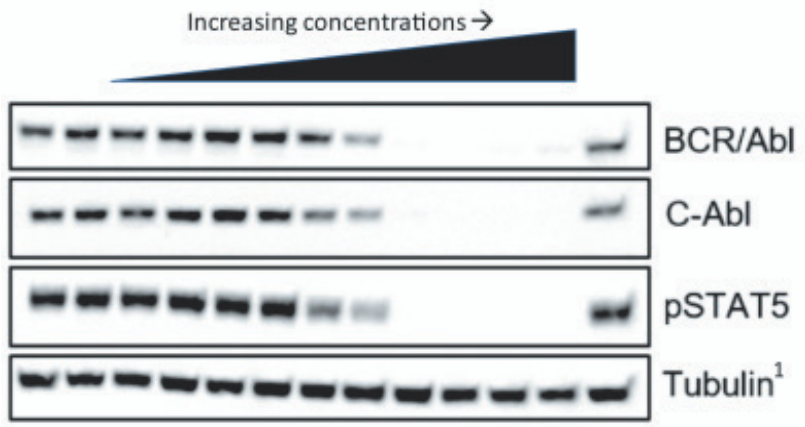
Versatility

We believe our PROTAC targeted protein degraders may have potential application in a wide range of therapeutic areas because the E3 ligases we currently target are expressed widely across tissue types. Ligands that bind to some proteins may be of only weak affinity. However, we believe that our PROTAC technology will allow the degradation of proteins through such low affinity active binding sites or non-functional binding sites. Our ability to design weak binding PROTAC targeted protein degraders that nonetheless initiate rapid ubiquitination and subsequent degradation of targeted proteins has the potential to expand the number of disease-causing proteins targeted for drug development to include the up to 80% of proteins that cannot be addressed by existing small molecule therapies and are currently considered undruggable. We believe that rendering these targets druggable for the first time represents the true breadth and potential of our PROTAC platform.

We conducted an experiment designed to demonstrate that non-functional binding sites, analogous to those that may be present on proteins considered undruggable, can be used to target proteins for degradation by PROTAC targeted protein degraders. The figure below depicts a structural model of the Abl tyrosine kinase. This protein kinase possesses an enzymatic active site that is inhibited by the marketed small molecule, imatinib. The Abl kinase also has a second, non-functional active site, called an allosteric site (shown in the red circle below), in its structure that can bind a different small molecule, named GNF-2, which despite binding allosterically (with a relatively weak K_D of 500 nM), inhibits only the wild type protein (C-Abl), but not BCR-Abl—a mutated form of Abl implicated in chronic myelogenous leukemia.



When GNF-2 is converted into a PROTAC targeted protein degrader and used to treat cells, both BCR-Abl and C-Abl are effectively degraded. The figure below shows western blots of cells treated by increasing concentrations of our PROTAC targeted protein degrader and shows decreasing presence of each of BCR-Abl and C-Abl protein (depicted by a lighter shade of the BCR/Abl and C-Abl band in the western blot). Downstream signaling, as denoted by reduction of phosphorylated Stat5 (pStat5), is subsequently inhibited.



[1]Tubulin is a protein the GNF-2 PROTAC targeted protein degrader is not targeted to degrade, and is included as a control to ensure total protein is equivalent in each lane.

PROTAC-induced degradation may offer a solution for undruggable proteins because only binders, not functional inhibitors, are needed to facilitate E3 ligase recruitment and initiation of the degradation process. The probability of finding a suitable ligand using binding-site-agnostic screening is increased because the function of the ligand itself is not required. As a result, there is the potential for PROTAC targeted protein degraders to generate therapeutics from poorly selective ligands, weak-affinity ligands, or ligands that may not be intrinsically biologically active.

Our Programs

ARV-110 for AR Degradation in Men with Metastatic Castration-Resistant Prostate Cancer

We are developing ARV-110, an orally bioavailable, AR degrading PROTAC targeted protein degrader, for the treatment of men with metastatic castration-resistant prostate cancer, or mCRPC. We have chosen AR degradation as our initial therapeutic focus due to the well-documented biology of AR signaling as the principal driver of this cancer. ARV-110 has demonstrated activity in preclinical models of AR overexpression and AR mutations, both common mechanisms of resistance to current standard-of-care agents in men with prostate cancer. We believe that the differentiated PROTAC pharmacology of ARV-110, including its iterative activity, has the potential to translate into significantly improved clinical outcomes over current standard-of-care agents.

Prostate Cancer

In the United States, prostate cancer is both the second most prevalent cancer in men and the second leading cause of cancer death in men. Current estimates predict that one in nine men will be diagnosed with prostate cancer in his lifetime. The American Cancer Society estimates that in 2019 there will be over 174,000 new cases of prostate cancer in the United States and approximately 31,000 deaths from the disease. Further, based on an article published in 2015 in PLoS ONE, a peer-reviewed scientific journal, there are approximately between 35,000 and 45,000 new incidences of mCRPC each year. Men with mCRPC have a poor prognosis and a predicted survival rate of fewer than two years from the initial time of progression.

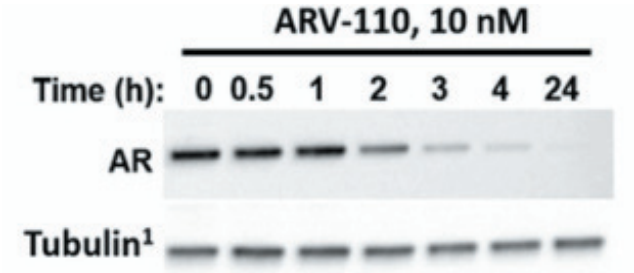
Treatment options for prostate cancer depend on many different factors, including the stage of the cancer. Castration-resistant prostate cancer is defined by disease progression despite androgen deprivation therapy, or ADT, and is often indicated by rising levels of prostate-specific antigen, or PSA. In making treatment evaluations, physicians monitor disease burdens in several ways, including changes in PSA levels. Increased PSA blood levels are considered by many physicians as indicative of cancer progression, and alternative treatment options may be considered. Current standard of care for men with castration-resistant prostate cancer provides that patients should initially receive a combination of ADT and either abiraterone, which works by decreasing androgen levels, or enzalutamide, which works by blocking androgen binding to AR. If the disease progresses despite these second-generation hormonal therapies, chemotherapy is considered the next treatment option. Treatment with chemotherapy is generally postponed for as long as possible due to the potential for severe side effects including neuropathies, nausea, diarrhea, decreased mental capacity and increased risk of infections.

Androgen receptor remains the principal driver of castration-resistant prostate cancer progression during the transition from localized to metastatic disease, with AR gene amplification occurring in 40% to 60% of patients, amplification of a transcription regulatory region upstream of the AR gene occurring in 70% to 87% of patients, and AR point mutations occurring in approximately 15% of patients. Between 15% to 25% of patients do not respond to either abiraterone or enzalutamide and the vast majority of the responsive patients will ultimately become resistant, resulting in limited survival. There remains meaningful unmet medical need in the treatment paradigm of mCRPC, including a significant underserved set of patients who are or become resistant to current therapies. Based on our preclinical data, we believe our PROTAC targeted protein degraders may overcome these known resistance mechanisms and create meaningful clinical benefit for patients.

Preclinical Development

We have conducted a comprehensive preclinical program to study ARV-110 as a potential treatment for men with mCRPC and initiated dosing in a Phase 1 clinical trial in March 2019.

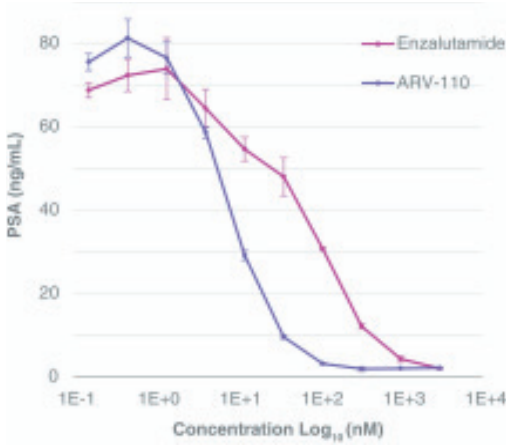
In ***in vitro*** models, ARV-110 degraded 95% to 98% of AR in multiple cell lines typically used in prostate cancer research. For example, the figure below shows a western blot of Vertebral Cancer of the Prostate, or VCaP, cells treated with ARV-110 at 10 nM concentration. The figure below shows decreasing presence of AR (depicted by a lighter shade of the AR band in the western blot) over time with near maximal degradation of AR within four hours of administration.



[1]Tubulin is a protein ARV-110 is not targeted to degrade, and is included as a control to ensure total protein is equivalent in each lane.

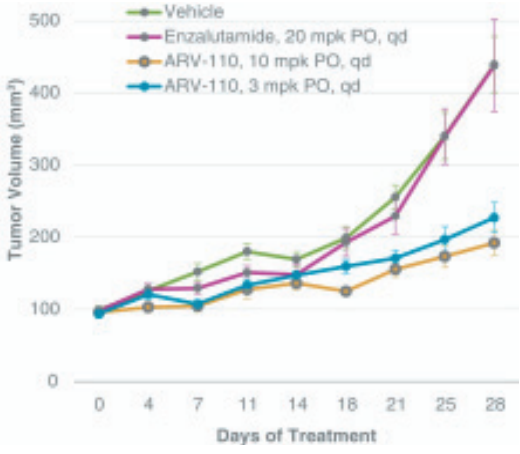
ARV-110 is also highly selective for AR. A proteomic analysis of VCaP cells treated ***in vitro*** with ARV-110 at a 10 nM concentration for eight hours demonstrated that only AR was degraded from the nearly 4,000 measured proteins.

Importantly, in addition to AR degradation and selectivity, we have observed in preclinical studies the ability of ARV-110 to potently inhibit prostate cancer cell growth and reduce PSA levels. In addition to guiding treatment decisions, reduction in PSA is often an indicator of the effectiveness of treatment in clinical trials, although it is not recognized as a surrogate endpoint for purposes of regulatory approval. The figure below shows ***in vitro*** inhibition of PSA synthesis in Lymph Node Cancer of the Prostate cells, which are androgen-sensitive human prostate adenocarcinoma cells, that have been engineered to overexpress AR, using ARV-110 as compared with enzalutamide. In this study, ARV-110 demonstrated equivalent reduction in PSA to enzalutamide at ten-fold lower concentration levels.

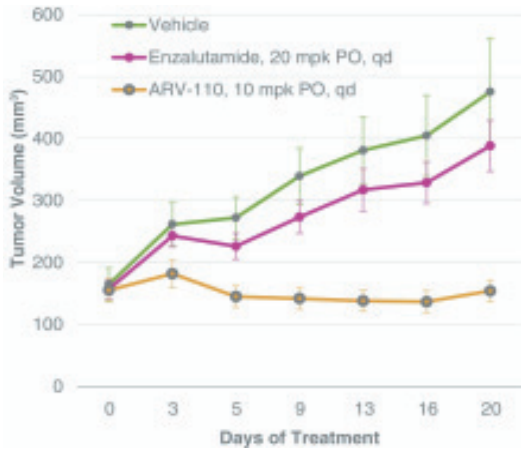


In ***in vivo*** mouse models, ARV-110 has inhibited AR-dependent tumor growth, in a statistically significant manner. ARV-110 exhibited superior tumor growth inhibition compared to enzalutamide in both castrated and intact (non-castrated) xenograft models derived from VCaP cell lines.

To assess the ability of ARV-110 to treat enzalutamide-resistant cancers, we conducted ***in vivo*** studies of ARV-110 in an enzalutamide-resistant VCaP xenograft model. These VCaP tumors acquired resistance to enzalutamide after being continuously propagated in castrated, enzalutamide treated mice for approximately three years. This resistance can be seen in the figure below, as tumors in mice dosed with enzalutamide grew at nearly the same rate as tumors in mice dosed only with the drug vehicle—a control similar to dosing a placebo. Orally delivered ARV-110 significantly inhibited tumor growth, described as tumor growth inhibition, or TGI, in these enzalutamide-resistant VCaP tumors.

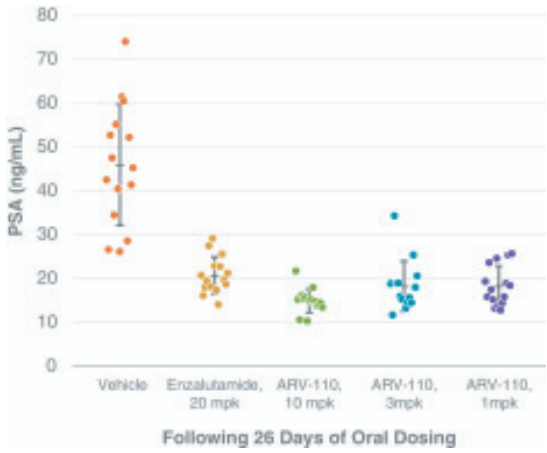


We have also conducted preclinical studies of ARV-110 for enzalutamide-insensitive cancers. We conducted an ***in vivo*** study using a tumor line derived directly from a patient, referred to as a patient derived xenograft, or PDX, model. This model is derived from a tumor from a patient not treated with enzalutamide but that is insensitive to enzalutamide. This insensitivity can be seen in the figure below, as tumors in mice dosed with enzalutamide grew at only a slightly slower rate than tumors in mice dosed only with the drug vehicle. In contrast, orally delivered ARV-110 significantly inhibited tumor growth in these enzalutamide-insensitive tumors, achieving a TGI value of 100%. Further, PSA levels in the plasma of mice following 20 days of ARV-110 dosing significantly decreased in comparison to those dosed with only the drug vehicle or enzalutamide.



We believe the activity of ARV-110 in the above VCaP and PDX models may closely reflect enzalutamide resistance or insensitivity in the clinic and shows the potential for treatment of patients whose tumors have become resistant to, or demonstrate intrinsic resistance to, a current standard-of-care agent.

ARV-110 has also reduced the levels of PSA in plasma comparable to levels achieved with enzalutamide in a different VCaP xenograft mouse model but at a lower dosing level. The figure below shows measurements of levels of PSA in the plasma of mice following 26 days of oral, daily dosing of either a vehicle, enzalutamide or ARV-110 at multiple dosing levels.



We conducted IND-enabling Good Laboratory Practice, or GLP, toxicology studies with ARV-110 in rats and dogs to support advancement of ARV-110 into clinical development. Both study designs called for animals to be treated once daily, orally for 28 days, followed by a 14-day recovery period for high dose animals. We believe both studies provide favorable safety margins of approximately five to ten times higher than the anticipated therapeutic doses.

In the rat study, a no observed adverse effect level, or NOAEL, of 40 mpk, the mid-dose, in female animals and 120 mpk, the high dose, in male animals was identified. All findings observed in male high-dose animals were considered reversible by the study director. Atrophy of the prostate and seminal vesicles was noted in male animals at all dose levels and we believe is attributable to the pharmacologic activity of ARV-110.

In the dog study, the NOAEL was 10 mpk per day, the mid-dose. The high dose of 30 mpk per day exceeded the maximum tolerated dose, and dosing in this group was stopped prior to the planned completion to allow for collection of reversibility data. Elevations in liver function enzymes noted in some mid- and high-dose animals were considered reversible by the study director, and non-adverse as they were without microscopic correlates. In addition, at all dose levels, including animals receiving vehicle only, gastrointestinal alteration such as loose and abnormally colored stools were noted. Decreased prostate weights were noted in all male animals and we believe are attributable to the pharmacologic activity of ARV-110.

Phase 1 Clinical Trial

In March 2019, we initiated dosing in a Phase 1 clinical trial of ARV-110. Our Phase 1 trial is designed as an open label, dose-escalation study of ARV-110 in approximately 28 to 36 men with mCRPC whose disease has progressed on at least two prior systemic therapies, one of which must have been enzalutamide or abiraterone. The Phase 1 trial will primarily investigate the safety and tolerability of ARV-110. Secondary endpoints include characterization of ARV-110's pharmacokinetic profile and preliminary assessment of biochemical and clinical activity based on evaluation of PSA levels, and radiographic measurement of evaluable lesions. The anti-tumor effects of ARV-110 in measurable lesions will be assessed using Response Evaluation Criteria in Solid Tumors, or RECIST criteria, a standardized set of rules for response assessment based on tumor shrinkage which is widely used in oncology clinical trials. We also will evaluate exploratory markers of disease burden, such as circulating tumor cell enumeration, as exploratory endpoints of the trial. The dose escalation portion of the trial will enroll patients at four study centers in the United States. The protocol provides for a starting dose of 35 mg/day, administered orally. We expect preliminary results from this portion of the trial in the second half of 2019.

If a safe dose is identified for further development, we expect to enroll an additional 60 patients with mCRPC in an expansion cohort, at which time additional trial sites may be added. Patients in the expansion cohort will be treated at the recommended Phase 2 dose. We expect that data from these patients will assist us in further characterizing the safety and pharmacokinetic profile of ARV-110 and allow us to better understand the disease characteristics and AR status of those patients who may derive benefit from ARV-110 therapy. We expect to analyze data collected from patients in the expansion cohort according to the following patient subsets: (1) pre- and post-chemotherapy; (2) post-enzalutamide or post-abiraterone; (3) post-enzalutamide and post-abiraterone; and (4) presence or absence of AR splice variants, AR mutations and AR amplification.

Next Generation AR Degraders

We are developing additional PROTAC targeted protein degraders capable of degrading AR and certain AR splice variants. Our next generation AR degrader is being developed to target and degrade AR and certain additional, clinically relevant AR point mutations, most notably the L702H point mutation. The L702H point mutation in the ligand-binding domain of AR results in activation of the AR by glucocorticoids and can cause resistance to a standard of care regimen.

AR-V7 Degraders

We expect that results from our Phase 1 clinical trial of ARV-110 will provide further data on the role of androgen receptor splice variant-7, or AR-V7, in prostate cancer. ARV-110 binds to full-length AR at its ligand-binding domain. AR-V7 is a truncated form of AR that lacks the ligand-binding domain necessary to bind with ARV-110 and which ARV-110 therefore does not degrade. AR exists as a dimer, a complex made up of two single AR proteins. AR-V7 can form a dimer with a full-length AR, and such non-identical protein dimers are called heterodimers. We believe that ARV-110, by degrading the full-length AR component of the heterodimer, will successfully inactivate AR-V7-directed signaling. Although shown as a heterodimer preclinically, there is uncertainty as to whether AR-V7 and AR form a heterodimer in patients' tumors. It is also possible that AR-V7 signals through V7-only dimers, which would be unaffected by ARV-110. Although the presence of AR-V7 has been shown to correlate with a lack of response to enzalutamide and abiraterone, a recent study demonstrated that approximately 40% of patients with AR-V7 expressing circulating tumor cells show a PSA response to enzalutamide. Given the evolving potential role of AR-V7 in prostate cancer, as a follow-on to ARV-110, we are exploring the identification and development of a PROTAC targeted protein degrader that can degrade AR-V7 directly, as well as other AR splice variants.

ARV-471 for ER Degradation in Women with Locally Advanced or Metastatic ER positive / HER2 negative Breast Cancer

We are developing ARV-471, an orally bioavailable ER degrading PROTAC targeted protein degrader, as an alternative to, and potentially more potent degrader than, the intramuscular injection fulvestrant and other selective ER degraders currently in development for the treatment of women with locally advanced or metastatic ER positive / HER2 negative breast cancer. Similar to our AR program, we have chosen ER degradation as a therapeutic focus given the well-documented biology of ER signaling as a principal driver in breast cancer. ARV-471 has demonstrated activity in locally advanced or metastatic ER positive / HER2 negative breast cancer preclinical models. We plan to clinically investigate ARV-471 for use as a single agent and in combination with CDK 4/6 inhibitors such as palbociclib. We believe ARV-471 has the potential to improve clinical outcomes over current standards of care for women with locally advanced or metastatic ER positive / HER2 negative breast cancer.

Breast Cancer

In the United States, breast cancer is the second most common cancer and the second leading cause of cancer death in women. The American Cancer Society estimates that in 2019 there will be approximately 268,000 women diagnosed with invasive breast cancer in the United States. Metastatic breast cancer accounts for approximately 6% of newly diagnosed cases. Approximately 80% of newly diagnosed breast cancers are ER+, with many patients developing resistance to current treatment options over time.

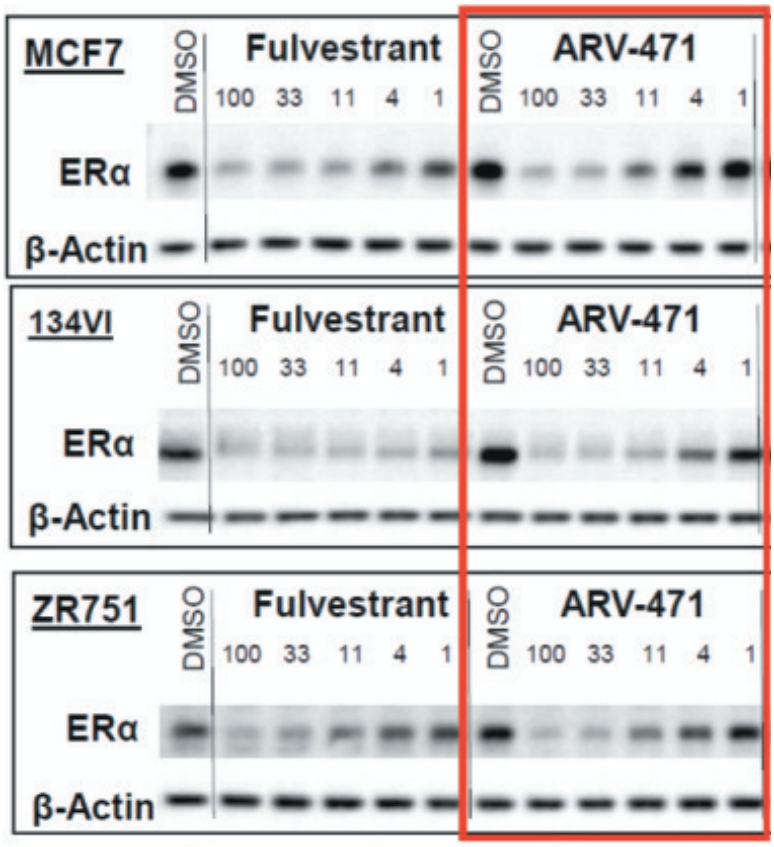
Treatment options for breast cancer depend on many different factors, including the stage of the cancer and whether the cancer cells contain hormone receptors. Women with locally advanced or metastatic breast cancer are treated with systemic therapy, including hormone therapy, chemotherapy and targeted therapy, either as single-agents or in combination. Women with locally advanced or metastatic ER positive / HER2 negative breast cancer are often treated with hormone therapy, such as tamoxifen or an aromatase inhibitor, sometimes in combination with targeted drugs such as CDK 4/6 inhibitors. In patients with aggressive disease or whose disease continues to progress with a hormonal treatment regimen, chemotherapy may be prescribed. Treatment with chemotherapy is generally postponed for as long as possible due to the potential for severe side effects including neuropathies, nausea, diarrhea, decreased mental capacity and increased risk of infections.

A current standard of care for women with ER positive / HER2 negative locally advanced or metastatic breast cancer is fulvestrant, an ER degrader administered as a monthly intramuscular injection, either as a single-agent or in combination with another targeted therapy. While fulvestrant has validated the importance of ER degradation as a therapeutic intervention, up to 50% of ER can remain when compared to baseline levels after six months of treatment with fulvestrant, providing an opportunity for more potent ER degraders, such as our PROTAC targeted protein degraders.

Preclinical Development

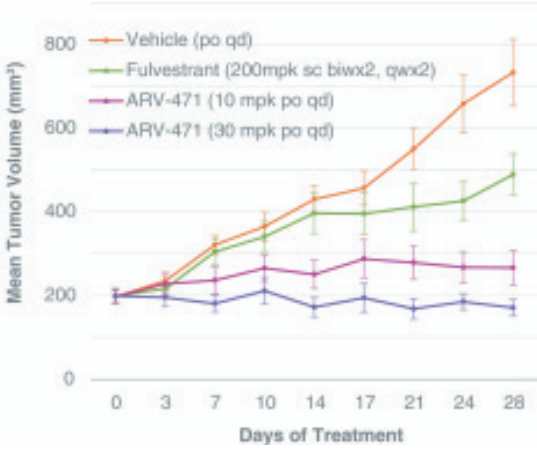
We are conducting a comprehensive preclinical program to study ARV-471 as a potential treatment for women with locally advanced or metastatic ER positive / HER2 negative breast cancer. In our preclinical studies, ARV-471 was a superior degrader of ER compared to fulvestrant. ARV-471 has also shown superior tumor growth inhibition when combined with a CDK4/6 inhibitor compared to fulvestrant and the same combination partner.

In in vitro models, ARV-471 has induced ER degradation in multiple cell lines typically used in breast cancer research. For example, the figure below shows western blots of MCF-7 cells, 134VI cells, and ZR751 cells, all ER positive / HER2 negative breast cancer cell lines, treated at varying nanomolar concentrations of ARV-471 and fulvestrant. This experiment indicates decreasing presence of ER in each cell line (depicted by a lighter shade of the ER band in the western blot) from right to left as drug concentrations increase. AR-471 achieved a DC_{50} in the MCF-7 cells of 1.8nM.

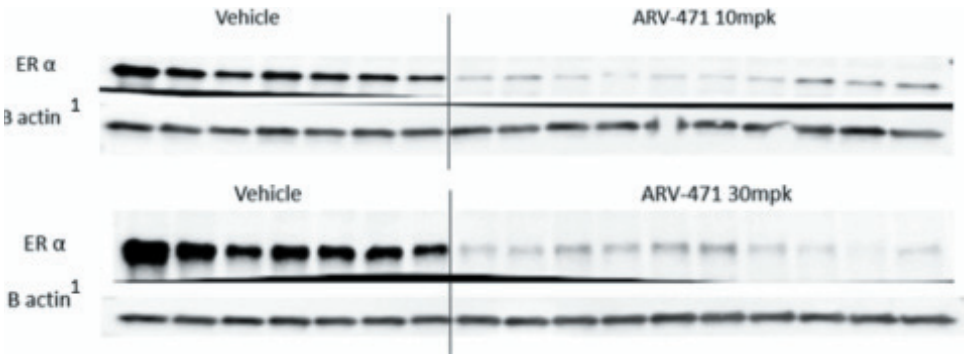


[1]Beta-actin is a protein Fulvestrant and ARV-471 are not targeted to degrade, and is included as a control to ensure total protein is equivalent in each lane.

In ***in vivo*** experiments ARV-471 has achieved superior tumor growth inhibition and degradation compared to fulvestrant. We have tested ARV-471 for tumor growth inhibitory activity using an industry-standard MCF-7 xenograft mouse model. MCF-7 is a well-characterized estradiol-dependent ER positive / HER2 negative cell line that forms tumors when implanted in the mammary fat pad of female mice. As shown in the figure below, ARV-471 resulted in very high tumor growth inhibition when dosed daily orally at 10 milligrams per kilogram, or mpk, and more than 80% tumor shrinkage when dosed daily orally at 30 mpk for 28 days. At both doses, ARV-471 demonstrated superior activity compared to a clinically relevant dose of fulvestrant, which is 200 mpk twice per week for two weeks and then once per week for two weeks.

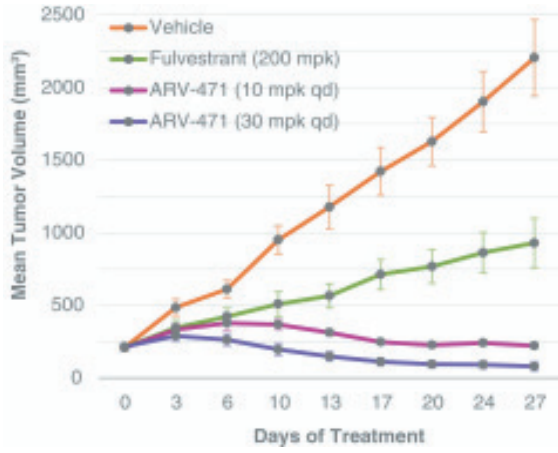


After 28 days of dosing in this efficacy study, the MCF-7 tumors were removed from the mice and processed for western blots to observe the level of ER degradation induced by oral dosing of ARV-471. Each column of the western blot in the figure below represents an individual tumor. Beta-actin is a protein included in the western blot as a total protein loading control. As depicted by the lighter shades of the ER band, ARV-471 reduced ER by 85%, on average, at 10 mpk as compared to the control tumors and by 89%, on average, at 30 mpk as compared to the control tumors.

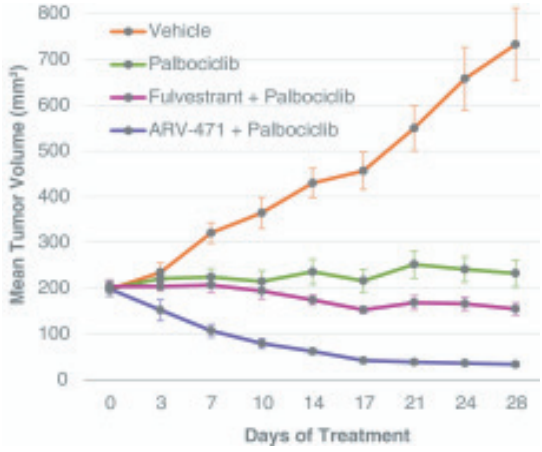


1 Beta-actin is a protein ARV-471 is not targeted to degrade, and is included as a control to ensure total protein is equivalent in each lane.

We have also conducted preclinical studies to test ARV-471 in a model using a PDX model. This model is derived from a tumor with an ESR1 mutation (Y537S), which is a mutation in the ER that occurs in patients who have been treated with standard-of-care agents such as tamoxifen or an aromatase inhibitor, such as letrozole, and has been cited as a mechanism of resistance to those drugs. These studies included a comparison with fulvestrant. The figure below shows the results of this 28-day dosing study. In this study, oral ARV-471 inhibited tumor growth by 99% at the 10 mpk dosing level and by 106% at the 30 mpk dosing level. ARV-471 was also observed to be a superior inhibitor of tumor growth, at both the 10 mpk and 30 mpk dosing levels, compared to a clinically relevant dose of 200 mpk of fulvestrant. Further, ARV-471 was shown to reduce ER by 79% and 88% at the 10 mpk and 30 mpk dosing levels, respectively, compared with 63% at the 200 mpk of fulvestrant dosing level.



We have also conducted studies of ARV-471 in combination with palbociclib, a CDK4/6 inhibitor that is standard of care when used together with fulvestrant. In these studies, we have achieved significant tumor shrinkage with ARV-471 in ER positive / HER2 negative MCF-7 xenograft models. As shown in the figure below, in a 28-day dosing study in MCF-7 xenografts, ARV-471 at 30 mpk daily in combination with palbociclib was superior in shrinking tumors, as compared to either palbociclib as a single agent at 60 mpk daily, or the standard-of-care combination of palbociclib at 60 mpk daily plus fulvestrant at 200 mpk twice per week for two weeks and then once per week for two weeks.



We believe that ARV-471 may show compelling activity in combination with other targeted agents currently used or in clinical trials for locally advanced or metastatic breast cancer including CDK4/6, PI3K and mTOR inhibitors and plan to test these combinations in preclinical models.

We have conducted IND-enabling GLP toxicology studies with ARV-471 in rats and dogs and believe that these studies support advancement of ARV-471 into clinical development. Both studies are now in the reporting phase. The designs for these studies called for animals to be treated once daily, orally for 28 days, followed by a 28-day recovery period at each dose level in the rat study and for the high dose animals only in the dog study.

In the rat study, animals were treated at doses of 0 (vehicle control), 3, 10, 30 and 100 mpk/day. The NOAEL was 100 mpk, the high dose. All findings observed were considered reversible by the study director. Evidence of pharmacologic activity was noted in the reproductive organs of rats at the 3 mpk dose level and higher. In the dog study, animals received 0 (vehicle control), 15, 45 or 90 mpk/day. The NOAEL was 90 mpk, the high dose. All findings observed in high-dose animals were considered reversible by the study director.

Our Planned Phase 1 Clinical Trials

We expect to file an IND for ARV-471 in the second quarter of 2019 and dose the first patient in a Phase 1 clinical trial in the third quarter of 2019. We expect to design our Phase 1 trial as an open-label dose-escalation study in approximately 28 to 36 women with locally advanced or metastatic ER positive / HER2 negative/HER2- breast cancer who have progressed on at least two prior endocrine therapy regimens. We expect to include patients who may have received up to three prior regimens of cytotoxic chemotherapy.

The Phase 1 trial will primarily investigate the safety and tolerability of ARV-471 and characterize its pharmacokinetic profile. We will also evaluate ER degradation by comparing ER levels in pre-treatment and post-treatment tumor biopsies in patients with appropriate lesions. Patients with measurable disease will be evaluated for anti-tumor responses using RECIST criteria. If a safe dose identified for further development, an expansion cohort may be added by amendment. In addition, we plan to investigate the anti-tumor effects of ARV-471 in combination with a CDK4/6 inhibitor.

Assuming ARV-471 has a favorable profile in these early clinical trials, we initially plan to pursue an indication in patients who have failed prior standard of care therapies, with the intention of moving to patients in earlier lines of treatment, including first-line metastatic, localized and adjuvant disease settings.

Our Discovery Programs

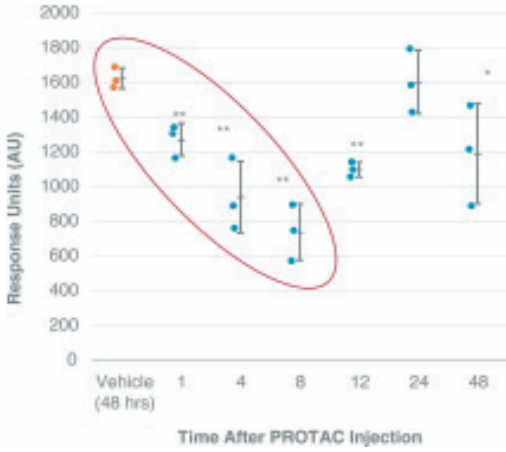
Neurodegenerative Diseases

Neurodegenerative diseases are generally progressive in nature and result in the degeneration and often death of neurons in the brain, leading to cognitive decline, functional impairment and eventually death. These diseases affect a rapidly growing patient population and represent one of the largest unmet medical needs of our time. Alzheimer's and Parkinson's diseases encompass the largest patient populations among the neurodegenerative diseases. The Alzheimer's Association estimates that approximately 5.7 million Americans have Alzheimer's dementia, and the Parkinson's Foundation estimates that nearly one million Americans will be living with Parkinson's disease by 2020. Both Alzheimer's disease and Parkinson's disease are characterized by aggregations of proteins in the brain, making them well suited potential therapeutic indications for our PROTAC technology.

Inhibitor-based therapies targeting the proteins thought to be the cause of these neurodegenerative diseases have failed to show clinically meaningful benefit to date. While some existing products provide symptomatic relief to Alzheimer's and Parkinson's patients, they have significant side effect risks and over time gradually lose their effectiveness in treating the symptoms of the disease. Further, there are no approved disease-modifying treatments for Alzheimer's or Parkinson's.

Developing PROTAC Targeted Protein Degraders that Degrade Proteins Associated with Neurodegenerative Diseases

In preclinical studies, we have established the potential of our PROTAC platform in the central nervous system, or CNS, with demonstration of both ***in vitro*** and ***in vivo*** degradation of tau protein, a target classically associated with neurodegenerative diseases, including Alzheimer's disease. In direct injections of a tau-directed PROTAC targeted protein degrader into the hippocampi of mice, we have shown a statistically significant reduction in tau levels of approximately 50%. The figure below shows a single 3 microliter (μL) injection of a 1 mg/μL solution of tau PROTAC targeted protein degrader into mouse hippocampus reduced tau levels over an eight-hour period. Total tau was measured with a Meso Scale Discovery, or MSD, assay, a commonly used assay for measuring specific molecules. The circled points show the reduction in tau over a period of eight hours after PROTAC targeted protein degrader injection.



The Blood Brain Barrier Challenge

The human brain contains approximately 400 miles of blood vessels lined by closely linked endothelial cells to form the blood brain barrier, which protects the brain from toxins and foreign chemicals by regulating the transfer of proteins, nutrients and waste products. As a result, delivery of therapeutics to the brain creates unique challenges.

Engineering products that cross the blood brain barrier is a highly desirable characteristic in developing effective therapeutics for patients with neurodegenerative diseases as compared with therapies delivered directly into the CNS. Any product candidates for neurodegenerative disease must reach their intended targets in the brain at exposure levels that will provide a therapeutic effect, while having an acceptable safety profile.

Developing PROTAC Targeted Protein Degraders that Cross the Blood Brain Barrier

We have achieved brain penetration in rodents with intravenously administered PROTAC targeted protein degraders designed to target tau and **α-synuclein.** These PROTAC targeted protein degraders achieved brain/plasma ratios of 0.5 to 5.0, which are comparable to approved brain tumor agents. When we further tested a subset of these PROTAC targeted protein degraders, we observed distribution of the PROTAC targeted protein degraders into both the hippocampus and the cerebellum. In these experiments, our PROTAC targeted protein degraders crossed the blood brain barrier and achieved widespread penetration into different parts of the brain. We have also identified a PROTAC targeted protein degrader capable of degrading tau in an ***in vitro*** experiment that also penetrates the blood brain barrier. We are conducting ***in vivo*** experiments to confirm the blood brain barrier penetration and test for tau degradation in rodent brains and expect to present preclinical data in the second half of 2019. We aim to optimize tau and **α-synuclein** PROTAC targeted protein degraders for a combination of compelling target degradation and blood brain barrier penetration with broad CNS tissue distribution in rodent brains, through intravenous and oral delivery.

In March 2018, we entered into a sponsored research agreement with The Silverstein Foundation for Parkinson's with GBA that provides us with up to $0.8 million of funding to complement our research efforts to discover a blood brain barrier-penetrant **α-synuclein-targeting** PROTAC targeted protein degrader.

Other Oncology Targets and Undruggable Targets

We have active discovery programs to evaluate additional established targets in oncology, as well as other currently undruggable targets. In line with our strategy, we assess potential discovery programs on a target by target basis to decide whether our PROTAC targeted protein degraders provide a compelling differentiated approach over standard-of-care or other, existing or potential competing mechanisms of action directed against a specific target. In the case of currently undruggable targets, we assess whether the features of our PROTAC targeted protein degraders, including their potential to degrade proteins via sites other than enzymatic active sites and the ability to initiate the degradation process using only weak binders, offer us opportunities to degrade those targets.

Intellectual Property

Our commercial success depends in part upon our ability to secure and maintain patent and other proprietary protection for our platform protein degradation technologies, including our PROTAC targeted protein degrader programs, product candidates and know-how related to our business, defend and enforce our intellectual property rights, in particular our patent rights, preserve the confidentiality of our trade secrets and operate without infringing valid and enforceable intellectual property rights of others.

The patent positions for biopharmaceutical companies like us are generally uncertain and can involve complex legal, scientific and factual issues. In addition, the coverage claimed in a patent application can be significantly reduced before a patent is issued, and its scope can be reinterpreted and even challenged after issuance. As a result, we cannot guarantee that any of our product candidates will be protected or remain protectable by enforceable patents. We cannot predict whether the patent applications we are currently pursuing will issue as patents in any particular jurisdiction or whether the claims of any issued patents will provide sufficient proprietary protection from competitors. Any patents that we hold may be challenged, circumvented or invalidated by third parties.

As of March 4, 2019 our patent estate that we own, co-own and in-license includes eight issued U.S. patents, eight foreign issued patents, and 152 pending patent applications in our patent portfolio.

PROTAC Patents and Patent Applications

Our PROTAC patent portfolio is generally organized into two categories: PROTAC platform patent filings, and PROTAC product candidate or protein target-specific patent filings.

PROTAC Platform

As of March 4, 2019, our PROTAC platform patent estate that we own, co-own, and in-license and that covers our various E3 ubiquitin ligase constructs included three issued foreign patents, ten pending U.S. patent applications and 67 pending foreign patent applications. This patent estate includes constructs that have ligands for the Von Hippel Lindau, or VHL, E3 ubiquitin ligase, the cereblon, or CRBN, E3 ubiquitin ligase, the inhibitor apoptosis protein, IAP, E3 ubiquitin ligase, and the human mouse double minute homolog, or MDM2 E3 ubiquitin ligase.

We exclusively license from Yale University a portfolio of patent and patent applications describing composition-of-matter claims encompassing PROTAC targeted protein degrader compounds comprised of ligands for the VHL E3 ubiquitin ligase as well as claims to associated methods of use. Patent applications have been filed in the United States, Brazil, Canada, China, Europe, Hong Kong, India, Japan and Korea, and a patent has been granted in Australia, Mexico and Russia. If granted, and all appropriate maintenance fees are paid, the expiration of these patents will be in 2033. We also co-own with Yale patent applications describing composition-of-matter claims encompassing PROTAC targeted protein degrader compounds comprised of ligands for the VHL E3 ligase. Patent applications have been filed in the United States, Australia, Canada, China, Europe, Hong Kong, India, Japan, Korea, Mexico and Russia. Arvinas' rights to these patent applications are governed by the Yale License Agreement described below.

We own three patent families with three pending U.S. patent applications with claims directed to composition of matter claims covering the CRBN E3 ubiquitin ligase ligand generically, the chemical linker group generically, and a small molecule or peptide ligand that binds to a target protein generically. Patent applications have been filed in the United States, Australia, Brazil, Canada, China, Europe, Hong Kong, India, Japan, Korea, Mexico and Russia. Patent applications in this family, if issued, would expire in 2035, without taking potential patent term extensions into account.

We own a patent application family describing composition-of-matter claims encompassing PROTAC targeted protein degrader compounds comprised of ligands for the IAP E3 ubiquitin ligase as well as claims to associated methods of use. Patent applications have been filed in the United States, Australia, Brazil, Canada, Europe, India, Korea, Mexico and Russia. If granted, and all appropriate maintenance fees are paid, the expiration of these patents will be in 2036.

We own a patent application family describing composition-of-matter claims encompassing PROTAC targeted protein degrader compounds comprised of ligands for the MDM2 E3 ubiquitin ligase as well as claims to associated methods of use. Patent applications under this family have been filed in the United States, Australia, Brazil, Canada, China, Europe, India, Japan, Korea, Mexico, and Russia. If granted, and all appropriate maintenance fees are paid, the expiration of these patents will be in 2036.

PROTAC Product Candidates

Our product or protein-specific patent applications were created to pursue more focused exclusivity around PROTAC targeted protein degrader compounds designed to target specific proteins. As of March 4, 2019, our PROTAC product patent portfolio that we own, co-own and in-license included four U.S. issued patents, four issued foreign patents, 26 pending U.S. patent applications, and 43 pending foreign patent applications.

We own two patent families describing composition-of-matter claims of PROTAC targeted protein degrader compounds addressing AR, as well as associated methods of use to treat cancer, one of which covers ARV-110. For the family covering ARV-110 we own one international patent application and one pending U.S. patent application with claims directed to composition of matter generically covering ARV-110 and methods of use thereof. The U.S. patent application and any foreign patent applications claiming priority to the international application, if issued, would expire in 2037, without taking potential patent term extensions into account. Patent applications under the other family have been filed in the United States, Australia, Brazil, Canada, China, Europe, India, Japan, Korea, Mexico, and Russia. If granted, and all appropriate maintenance fees are paid, the expiration of these patents will be 2036. A CIP patent application, an application filed during the lifetime of an earlier nonprovisional application, repeating some substantial portion or all of the earlier nonprovisional application and adding matter not disclosed in the earlier nonprovisional application, was filed in 2017 with composition of matter claims directed to compounds comprising of androgen binding moieties and chemical linkers generally. If granted, and all appropriate maintenance fees are paid, the U.S. CIP application will expire in 2036 without taking potential patent term extensions into account.

With regards to ARV-471, we own one international patent application and one pending U.S. patent application with claims directed to composition of matter generically covering ARV-471 and methods of use thereof. The U.S. patent application and any foreign patent applications claiming priority to the international application, if issued, would expire in 2037, without taking potential patent term extensions into account.

We and Yale co-own seven patent families describing composition of matter claims of PROTAC targeted protein degrader compounds addressing certain discovery and other potential protein targets, and associated methods of use. Patent applications for each of these have been filed in the United States. In addition, patent applications have been filed under the Patent Cooperation Treaty at the international stage for four of the families and with the European Patent Office for one of the families. Our rights to these patent applications are governed by the Yale License Agreement described below.

We also co-own with Genentech one United States patent application to PROTAC targeted protein degrader compounds addressing a specific protein. Arvinas' rights to that patent application are governed by the Genentech License Agreement described below.

The term of individual patents depends upon the legal term of the patents in the countries in which they are obtained. In most countries in which we file, the patent term is 20 years from the earliest date of filing a non-provisional patent application.

In the United States, the term of a patent covering an FDA-approved drug may be eligible for a patent term extension under the Hatch-Waxman Act as compensation for the loss of patent term during the FDA regulatory review process. The period of extension may be up to five years beyond the expiration of the patent, but cannot extend the remaining term of a patent beyond a total of 14 years from the date of product approval. Only one patent among those eligible for an extension may be extended. Similar provisions are available in Europe and in certain other jurisdictions to extend the term of a patent that covers an approved drug. It is possible that issued U.S. patents covering ARV-110 and ARV-471 may be entitled to patent term extensions. If our product candidates receive FDA approval, we intend to apply for patent term extensions, if available, to extend the term of patents that cover the approved product candidates. We also intend to seek patent term extensions in any jurisdiction where they are available, however, there is no guarantee that the applicable authorities, including the FDA, will agree with our assessment of whether such extensions should be granted, and even if granted, the length of such extensions.

Trade Secrets

We also rely on trade secrets, technical know-how and continuing innovation to develop and maintain our competitive advantage. Our policy requires inventors who are identified on any company-owned patent applications to assign rights to us. We also rely on confidentiality agreements with our employees, consultants and other advisors to protect our proprietary information. Our policy is to require third parties that receive material confidential information to enter into confidentiality agreements with us.

Trademarks

We own the service mark PROTAC for pharmaceutical products development of new small molecules aimed at degrading disease-causing cellular proteins for treatment in the field of oncology, immunology, inflammatory diseases, and central nervous system disorders. We also own a U.S. trademark application for the mark PROTAC for small molecule products aimed at degrading disease-causing cellular proteins for treatment in the field of oncology, immunology, inflammatory diseases, and central nervous system disorders.

Licenses and Strategic Collaborations

Yale University License Agreement

In July 2013, we entered into a license agreement with Yale pursuant to which Yale granted us an exclusive, worldwide license under specified intellectual property rights for the treatment or prevention of any human or animal disease in which a product mediates degradation of one or more target proteins, which we refer to as the Field, subject to certain exceptions. These licensed intellectual property rights arose from the research conducted by Dr. Craig Crews at Yale. During the period in which Professor Crews serves as a member of our board of directors or scientific advisory board or has a similar advisory arrangement, has a consulting arrangement with us, or his laboratory is performing sponsored research for us, and so long as he is an employee or faculty member (including emeritus faculty member) at Yale, Yale will notify us of any inventions in the Field invented in Professor Crews' laboratory and such invention will be included in the licensed intellectual property, subject to the rights of any non-profit sponsor of the research to use such invention solely for non-profit purposes. In addition, the laboratory of Professor Crews is restricted from conducting any sponsored research, collaboration or other similar arrangement in the Field with a for-profit company while Professor Crews is engaged with us, except where such arrangement allows Yale to grant us licenses of any inventions developed in the laboratory of Professor Crews in the Field in the licensed territory.

We are obligated to use commercially reasonable efforts to implement a written plan we agreed to with Yale setting forth a description of any research and development, testing, governmental approval and commercialization activities relating to licensed products and our financing plans. We must update this plan on an annual basis to indicate progress to date on the plan and a schedule of major events required to commercialize licensed products.

Pursuant to the license agreement we paid to Yale an upfront payment of $149,511. We are responsible for paying Yale an annual license maintenance fee in varying amounts (ranging from the low tens-thousands of dollars to the mid to high tens-thousands of dollars) until the first sale to a third party of any licensed product, which is creditable against our royalty obligations for the given year. As of December 31, 2018, we have paid a total of $210,000 in license maintenance fees to Yale. We are required to pay Yale, subject to the achievement of specified development and regulatory milestones, payments aggregating up to approximately $3.0 million for the first licensed product and up to approximately $1.5 million for the second licensed product. We are not required to make any milestone payments for any licensed products beyond the first two. While the agreement remains in effect, we are required to pay Yale low single-digit royalties

on aggregate worldwide net sales of certain licensed products, which may be subject to reductions. Yale is guaranteed a minimum royalty payment amount (ranging from $200,000 to $500,000) for each year after the first sale of a licensed product that results in net sales. We must also pay Yale a mid-single digit to mid-double digit percentage, decreasing as a licensed product proceeds through development stages, of any consideration we receive from sublicensees, depending on the timing of such sublicense. We have previously paid to Yale $750,000 for sublicense consideration, representing the maximum amount required to be paid for sublicense consideration received prior to the filing of an IND for a licensed product. We are also responsible for costs relating to the prosecution and maintenance of the licensed patents. Finally, subject to certain conditions, all payments made by us to Yale (except patent costs) will be tripled during the pendency of any patent challenge made by us against Yale.

We have also agreed to pay for PROTAC targeted protein degrader research support from Yale pursuant to a sponsored research agreement that we entered into with Yale in July 2016 and amended in April 2018. Under the sponsored research agreement, as amended, we agreed to pay Yale an aggregate of $3.7 million over five years, ending in the first quarter of 2021, and as of December 31, 2018, we had paid Yale an aggregate of approximately $1.5 million. The research is performed by and under the supervision and direction of Professor Crews for so long as he is employed by Yale.

The license agreement remains in effect until (a) for certain products, the date on which the last claim of the licensed patents expires; and (b) for certain products, 10 years after the sale of such products. The expiration of the last to expire patent right licensed from Yale, if it issues as a patent and all appropriate maintenance fees are paid, is currently expected be in 2038. We could also obtain rights to additional patents, including through the issuance of pending patent applications, with later expiration dates, through our rights to any inventions in the Field invented in Professor Crews' laboratory, which could extend the term of the Yale Agreement. Either we or Yale may terminate the agreement for the other party's uncured material breach of certain provisions, we may terminate the agreement for convenience upon six months' prior notice, and Yale may terminate the agreement if we fail to make a payment when due, fail to obtain or maintain adequate insurance coverage or fail to achieve specified financing or regulatory milestone events. The agreement will automatically terminate if we become insolvent.

Genentech License Agreement

In September 2015, we entered into an Option and License Agreement with Genentech, Inc. and F. Hoffmann-La Roche Ltd, collectively referred to as Genentech, focused on PROTAC targeted protein degrader discovery and research for target proteins, or Targets, based on our proprietary platform technology, other than excluded Targets as described below. This collaboration was expanded in November 2017 through an Amended and Restated Option, License and Collaboration Agreement, which we refer to as the Restated Genentech Agreement.

The collaboration is managed by a joint research committee and a joint project team, each of which is comprised of representatives from us and Genentech. Decisions of the joint research committee and joint project team are made by consensus, with each party having one vote. If the joint research committee is unable to agree, and the parties' executives are not able to resolve the dispute, then Genentech has final decision-making authority, subject to specified limitations.

Under the Restated Genentech Agreement, Genentech has the right to designate up to ten Targets for further discovery and research utilizing our PROTAC platform technology. Genentech may designate as a Target any protein to which a PROTAC targeted protein degrader, by design, binds, to achieve its mechanism of action, subject to certain exclusions. Genentech also has the right to remove a Target from the collaboration and substitute a different Target that is not an excluded Target at any time prior to us commencing research on such Target or in certain circumstances following commencement of research by us.

Once a Target becomes subject to the collaboration, we are obligated to use diligent efforts to undertake a research program in accordance with a research plan agreed to by the parties for such Target. We are responsible for funding our activities under the research program for each Target up to the amount set forth in the budget for such Target agreed upon by the parties in the research plan. For costs incurred in excess of the budgeted amount, Genentech has the option of either having us continue the work on the Target and reimbursing us for our costs in doing so or terminating the work on such Target.

The research program for each Target contemplates that the discovery and research work will occur in two stages: Stage 1, in which our objective will be to identify a PROTAC targeted protein degrader that demonstrates in vitro protein degradation of the Target; and Stage 2, in which our objective will be to demonstrate certain ***in vitro*** and ***in vivo*** research and development activity, but not to complete toxicology studies or other necessary IND-enabling studies. For each Target, at the conclusion of Stage 1, Genentech has the opportunity to continue the research program for such Target or terminate all activities on such Target. At the conclusion of each stage, we are obligated to provide certain deliverables to Genentech, including a data package at the end of Stage 2. Genentech has an option to obtain an exclusive worldwide license to the applicable PROTAC targeted protein degraders directed against the applicable Target, which we refer to as Licensed PROTACs. Each such option must be exercised within a specified time after we deliver the data package for such Licensed PROTAC to Genentech. Once Genentech exercises an option, it is responsible, at its cost, to use diligent efforts to develop and commercialize the Licensed PROTAC through first commercial sale in the United States, the European Union and Japan.

During the term of the Restated Genentech Agreement, we and our affiliates are not permitted, either directly or indirectly, to conduct any activities in the design, identification or discovery of any small molecule pharmacologically active agent directed against a Target included in the collaboration, including certain PROTAC targeted protein degraders whose intended primary mechanism of action is, by design, through induction of proteasomal degradation of such Target.

Under the terms of the Restated Genentech Agreement, we received $11.0 million in 2015 and an additional $34.5 million in 2017 in upfront payments and expansion target payments. We are eligible to receive up to an aggregate of $27.5 million in additional expansion target payments if Genentech exercises its options for all remaining Targets. We are also eligible to receive payments aggregating up to $44.0 million per Target subject to the achievement of specified development milestones; payments aggregating up to $52.5 million per Target (assuming approval of two indications) subject to the achievement of specified regulatory milestones; and payments aggregating up to $60 million per Licensed PROTAC subject to the achievement of specified sales milestones. These milestone payments are subject to reduction if we do not have a valid patent claim covering the Licensed PROTAC at the time the milestone is achieved. We are also eligible to receive, on net sales of Licensed PROTACs, mid-single digit royalties, which may be subject to reductions.

Unless earlier terminated, the Restated Genentech Agreement will expire upon the expiration of all royalty periods for any Licensed PROTACs. The royalty period for each Licensed PROTAC expires on a country-by-country basis upon either (1) the expiration of the last-to-expire valid patent claim covering such Licensed PROTAC or (2) ten years after the first commercial sale with respect to such Licensed PROTAC, depending on whether the sale of the Licensed PROTAC is covered by an applicable valid claim. The expiration of the last to expire patent right licensed to Genentech, if it issues as a patent and all appropriate maintenance fees are paid, is currently expected be in 2038. We could also obtain rights to additional patents, including through the issuance of pending patent applications, with later expiration dates, or new Licensed PROTACs could be added to the agreement that are subject to additional royalty terms with later expiration dates, which in either case could extend the term of the Restated Genentech Agreement. Genentech has the right to terminate the Restated Genentech Agreement for convenience in its entirety or with respect to a specific Target on 60 days' prior notice. Either we or Genentech may terminate the agreement, in its entirety or with respect to a specific Target, if the other party is in material breach and such breach is not cured within the specified cure period. In addition, either we or Genentech may terminate the agreement in the event of specified insolvency events involving the other party. If Genentech terminates the agreement for convenience or if we terminate the agreement as a result of Genentech's uncured material breach or Genentech's insolvency, all licenses we granted to Genentech terminate (either in its entirety or with respect to a specific Target, as applicable based on the nature of the termination). If Genentech terminates the agreement as a result of our uncured material breach or our insolvency, all licenses that we granted to Genentech terminate (either in its entirety or with respect to a specific Target, as applicable based on the nature of the termination), except that Genentech has the right to elect to retain its licenses, in which case it would no longer be obligated to use diligent efforts to develop and commercialize the applicable Licensed PROTACs and its payment obligations to us would be reduced.

Pfizer License Agreement

In December 2017, we entered into a Research Collaboration and License Agreement with Pfizer, Inc., or Pfizer, setting forth our collaboration to identify or optimize PROTAC targeted protein degraders that mediate for degradation of target proteins, or Targets, using our proprietary platform technology that are identified in the agreement or subsequently selected by Pfizer, subject to certain exclusions. We refer to this agreement as the Pfizer Collaboration Agreement.

Under the Pfizer Collaboration Agreement, Pfizer has designated a number of initial Targets. For each identified Target, we and Pfizer will conduct a separate research program pursuant to a research plan. Pfizer may make substitutions for any of the initial Target candidates, subject to the stage of research for such Target.

We and Pfizer are obligated to use commercially reasonable efforts to complete our respective activities set forth in a research plan, including, in our case, the obligation to provide certain deliverables at the end of each stage. Under the research plan, we are required to provide compound formulation and conduct pharmacokinetic/pharmacodynamic and drug safety research and development activities in support of screening and other activities conducted by Pfizer relating to a Target. Following the provision of the deliverables by us for a stage, we will suspend the conduct of any further activities until Pfizer has exercised its right to proceed. If Pfizer does not exercise such right within the applicable time period, we will cease activities for such Target and such Target will no longer be part of the collaboration. Each party will bear its own costs in the conduct of such activities, except that any additional work that we agree with Pfizer to perform outside of the research plan will be paid for by Pfizer.

Pfizer has the right to exercise an option to obtain an exclusive worldwide license with respect to each Target for a specified period of time after receipt of the applicable deliverables for such Target. If Pfizer does not exercise its option for a Target, such Target is no longer subject to the Pfizer Collaboration Agreement. If Pfizer exercises such option, Pfizer will have an exclusive license to develop and commercialize compounds directed against such Target, subject to certain diligence obligations.

During the term of the Pfizer Collaboration Agreement, we and our affiliates are not permitted, either directly or indirectly, to develop or commercialize any pharmacologically-active agent whose primary mechanism of action is, by design, directed to a Target, or grant any license, covenant not to sue or other right to any third party for the conduct of such activities. There are no restrictions on Pfizer from developing, manufacturing or commercializing products, programs, technologies or processes that are similar to or may compete with any covered by the Pfizer Collaboration Agreement, subject to certain limitations on Pfizer's right to use our confidential information or know-how.

Under the terms of the Pfizer Collaboration Agreement, we received an aggregate of $28.0 million in upfront payments and milestone payments in the year ended December 31, 2018. We are entitled to receive up to an additional $37.5 million in option payments if Pfizer exercises its options for all Targets. We are also entitled to receive up to $225.0 million in development milestones and up to $550.0 million in sales-based milestones for all designated Targets. In December 2018, Pfizer triggered a milestone for which a payment of $2.5 million was received in January 2019. In addition, we are eligible to receive, on net sales of PROTAC targeted protein degrader-related products, mid- to high-single digit tiered royalties, which may be subject to reductions.

Unless earlier terminated, the Pfizer Collaboration Agreement will expire upon the expiration of all royalty obligations thereunder. The royalty period for each product developed under the Pfizer Collaboration Agreement will expire on a country-by-country basis upon the later of (1) the expiration of the last-to-expire valid patent claim that claims or covers the composition of matter of a compound contained within such product or (2) ten years after the first commercial sale with respect to such product. Pfizer has the right to terminate the Pfizer Collaboration Agreement for convenience in its entirety or with respect to a specific target on 60 days' prior notice. Either we or Pfizer may terminate the Pfizer Collaboration Agreement, in its entirety or with respect to a specific target, if the other party is in material breach and such breach is not cured within the specified cure period. In addition, either we or Pfizer may terminate the Pfizer Collaboration Agreement in the event of specified insolvency events involving the other party. If Pfizer terminates the agreement in its entirety or as a result of our uncured material breach or our insolvency, Pfizer retains its license with respect to Targets for which it has exercised an option (unless Pfizer elects otherwise), subject to reduced payment obligations.

Competition

The biotechnology and pharmaceutical industries are characterized by rapidly advancing technologies, intense competition and a strong emphasis on intellectual property and proprietary products. While we believe that our technology, expertise, scientific knowledge and intellectual property estate provide us with competitive advantages, we face potential competition from many different sources, including major pharmaceutical, specialty pharmaceutical and biotechnology companies, academic institutions, governmental agencies and public and private research institutions that conduct research, seek patent protection, and establish collaborative arrangements for research, development, manufacturing, and commercialization. Not only must we compete with other companies that are focused on protein degradation, but any product candidates that we successfully develop and commercialize will compete with existing therapies and new therapies that may become available in the future. Moreover, our industry is characterized by the existence of large numbers of patents and frequent allegations of patent infringement.

Our platform and product focus is the discovery and development of protein degradation therapies using our small molecule PROTAC targeted protein degraders. Other companies researching chimeric small molecules for protein degradation include C4 Therapeutics, Inc., Cullgen Inc., Kymera Therapeutics, Inc. and Nurix Therapeutics, Inc., all of which are currently in preclinical development. Further, several large pharmaceutical companies have disclosed preclinical investments in this field, including Amgen, AstraZeneca plc, Celgene, GlaxoSmithKline plc, Genentech and Novartis International AG. In addition to competition from other protein degradation therapies, any products that we develop may also face competition from other types of therapies, such as small molecule, antibody, or gene therapies.

Our lead product candidates target oncologic indications. The most common methods of treating patients in oncologic indications are surgery, radiation and drug therapy, including chemotherapy, hormone therapy and targeted drug therapy. There are a variety of available drug therapies marketed for cancer, including prostate cancer and breast cancer. In many cases, these drugs are administered in combination to enhance efficacy. Some of the currently approved drug therapies are branded and subject to patent protection, and others are available on a generic basis. Many of these approved drugs are well established therapies and are widely accepted by physicians, patients and third-party payors. In general, although there has been considerable progress over the past few decades in the treatment of cancer and the currently marketed therapies provide benefits to many patients, these therapies all are limited to some extent in their efficacy and frequency of adverse events, and none of them are successful in treating all patients. As a result, the level of morbidity and mortality from cancer remains high.

In addition to currently marketed drugs, there are also several product candidates in late stage clinical development for the treatment of oncologic indications, including for mCRPC and metastatic ER positive / HER2 negative breast cancer. These products in development include, in the case of metastatic ER positive / HER2 negative breast cancer, selective estrogen receptor degraders and may provide efficacy, safety, convenience and other benefits that are not provided by currently marketed therapies. As a result, they may provide significant competition for any of our product candidates for which we obtain market approval.

If any of our product candidates are approved for the indications for which we expect to conduct clinical trials, they will compete with the foregoing therapies and the currently marketed drugs and potentially any drugs in development. It is also possible that we will face competition from other biologic or pharmaceutical approaches as well as from other types of therapies.

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, obtaining regulatory approvals and marketing approved products than we do. These competitors also compete with us in recruiting and retaining qualified scientific and management personnel and establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs. Mergers and acquisitions in the pharmaceutical and biotechnology industries may result in even more resources being concentrated among a smaller number of our competitors. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies. These competitors also compete with us in recruiting and retaining qualified scientific and management personnel and establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs. Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize products that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than any products that we may develop. Our competitors also may obtain FDA or other regulatory approval for their products more rapidly than we may obtain approval for ours, which could result in our competitors establishing a strong market position before we are able to enter the market. In addition, our ability to compete may be affected in many cases by insurers or other third-party payors seeking to encourage the use of generic products. There are generic products currently on the market for certain of the indications that we are pursuing, and additional products are expected to become available on a generic basis over the coming years. If our product candidates are approved, we expect that they will be priced at a significant premium over competitive generic products.

The key competitive factors affecting the success of all our programs, if approved, are likely to be their efficacy, safety, convenience, price, level of generic competition and availability of reimbursement.

Commercialization Plans

We have not yet established our own commercial organization or distribution capabilities because our product candidates are still in preclinical development. Other than our discovery collaboration agreements, we have retained commercialization rights for all of our development programs. If any of our product candidates receive marketing approval, we will need to develop a plan to commercialize them in the United States and other key markets. We currently expect that we would build our own focused, specialized sales and marketing organization to support the commercialization in the United States of product candidates for which we receive marketing approval and that can be commercialized with such capabilities. We expect to utilize a variety of types of collaboration, co-promotion, distribution and other marketing arrangements with one or more third parties to commercialize our product candidates in markets outside the United States or for situations in which a larger sales and marketing organization is required.

As product candidates advance through our pipeline, our commercial plans may change. In particular, some of our research programs target potentially larger indications. Data, the size of the development programs, the size of the target market, the size of a commercial infrastructure and manufacturing needs may all influence our strategies in the United States, Europe and the rest of the world.

Manufacturing and Supply

We do not own or operate, and currently have no plans to establish, any manufacturing facilities. We rely on and expect to continue to rely on third-party contract manufacturing organizations, or CMOs, for both drug substance and finished drug product. We have engaged third-party manufacturers to supply the drug substances for ARV-110 and ARV-471. We have also engaged third-party manufacturers to develop and manufacture finished drug product for ARV-110 and ARV-471 that we plan to use in our Phase 1 clinical trials. We currently obtain our supplies from these manufacturers on a purchase order basis and do not have long-term supply arrangements in place. Should any of these manufacturers become unavailable to us for any reason, we believe that there are a number of potential replacements, although we may incur some delay in identifying and qualifying such replacements.

All of our drug candidates are organic compounds of low molecular weight, generally called small molecules, but which are larger than traditional small molecule therapeutics. We have selected these compounds not only on the basis of their potential efficacy and safety, but also for their ease of synthesis and reasonable cost of goods. In particular, our lead product candidates are manufactured using reliable and reproducible synthetic processes from readily available starting materials. The chemistry is amenable to scale up and does not require unusual equipment in the manufacturing process. We expect to continue to develop drug candidates that can be produced cost-effectively at contract manufacturing facilities.

Government Regulation and Product Approvals

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, pricing, quality control, approval, packaging, storage, recordkeeping, labeling, advertising, promotion, distribution, marketing, sales, reimbursement, post-approval monitoring and reporting, and import and export of biopharmaceutical products. The processes for obtaining marketing approvals in the United States and in foreign countries and jurisdictions, along with compliance with applicable statutes and regulations and other regulatory authorities, require the expenditure of substantial time and financial resources.

Approval and Regulation of Drugs in the United States

In the United States, drug products are regulated under the Federal Food, Drug, and Cosmetic Act, or FDCA, and applicable implementing regulations and guidance. The failure of an applicant to comply with the applicable regulatory requirements at any time during the product development process, including nonclinical testing, clinical testing, the approval process or post-approval process, may result in delays to 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 FDA's refusal to allow an applicant to proceed with clinical trials, refusal to approve pending applications, withdrawal of an approval, imposition of a clinical hold, issuance of warning letters and other types of letters, adverse publicity, voluntary product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, refusals of government contracts, restitution, disgorgement of profits or civil or criminal investigations and penalties brought by the FDA or Department of Justice, or DOJ, or other government entities, including state agencies.

An applicant seeking approval to market and distribute a new drug in the United States generally must satisfactorily complete each of the following steps before the product candidate will be approved by the FDA:

- preclinical testing including laboratory tests, animal studies and formulation studies, which must be performed in accordance with the FDA's good laboratory practice, or GLP, regulations and standards;
- submission to the FDA of an IND for human clinical testing, which must become effective before human clinical trials may begin;
- approval by an independent institutional review board, or 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 and efficacy of the product candidate for each proposed indication, in accordance with good clinical practices, or GCP;
- preparation and submission to the FDA of a new drug application, or NDA, for a drug product which includes not only the results of the clinical trials, but also, detailed information on the chemistry, manufacture and quality controls for the product candidate and proposed labeling for one or more proposed indication(s);
- review of the product candidate by an FDA advisory committee, where appropriate or if applicable;
- satisfactory completion of an FDA inspection of the manufacturing facility or facilities, including those of third parties, at which the product candidate or components thereof are manufactured to assess compliance with current good manufacturing practices, or cGMP, requirements and to assure that the facilities, methods and controls are adequate to preserve the product's identity, strength, quality and purity;
- satisfactory completion of any FDA audits of the clinical trial sites to assure compliance with GCP and the integrity of clinical data in support of the NDA;
- payment of user fees and securing FDA approval of the NDA to allow marketing of the new drug product; and
- compliance with any post-approval requirements, including the potential requirement to implement a Risk Evaluation and Mitigation Strategies, or REMS, and the potential requirement to conduct any post-approval studies required by the FDA.

Preclinical Studies

Before an applicant begins testing a product candidate with potential therapeutic value in humans, the product candidate enters the preclinical testing stage, including ***in vitro*** and animal studies to assess the safety and activity of the drug for initial testing in humans and to establish rationale for therapeutic use. Preclinical tests include laboratory evaluations of product chemistry, formulation and stability, as well as other studies to evaluate, among other things, the toxicity of the product candidate. The conduct of the preclinical tests and formulation of the compounds for testing must comply with federal regulations and requirements, including GLP regulations and standards. The results of the preclinical tests, together with manufacturing information, analytical data, any available clinical data or literature and plans for clinical trials, among other things, are submitted to the FDA as part of an IND. Some long-term preclinical testing, such as animal tests of reproductive adverse events and carcinogenicity, and long-term toxicity studies, may continue after the IND is submitted.

The IND and IRB Processes

An IND is an exemption from the FDCA that allows an unapproved product candidate to be shipped in interstate commerce for use in an investigational clinical trial and a request for FDA authorization to administer such investigational product to humans. Such authorization must be secured prior to interstate shipment and administration of any product candidate that is not the subject of an approved NDA. In support of a request for an IND, applicants must submit a protocol for each clinical trial and any subsequent protocol amendments must be submitted to the FDA as part of the IND. In addition, the results of the preclinical tests, together with manufacturing information, analytical data, any available clinical data or literature and plans for clinical trials, among other things, must be submitted to the FDA as part of an IND. The FDA requires a 30-day waiting period after the filing of each IND before clinical trials may begin. This waiting period is designed to allow the FDA to review the IND to determine whether human research subjects will be exposed to unreasonable health risks. At any time during this 30-day period, or thereafter, the FDA may raise concerns or questions about the conduct of the trials as outlined in the IND and impose a clinical hold or partial clinical hold. In this case, the IND sponsor and the FDA must resolve any outstanding concerns before clinical trials can begin.

Following commencement of a clinical trial under an IND, the FDA may also place a clinical hold or partial clinical hold on that trial. Clinical holds are imposed by the FDA whenever there is concern for patient safety and may be a result of new data, findings, or developments in clinical, nonclinical, and/or chemistry, manufacturing, and controls, or CMC. A clinical hold is an order issued by the FDA to the sponsor to delay a proposed clinical investigation or to suspend an ongoing investigation. A partial clinical hold is a delay or suspension of only part of the clinical work requested under the IND. For example, a specific protocol or part of a protocol is not allowed to proceed, while other protocols may do so. No more than 30 days after imposition of a clinical hold or partial clinical hold, the FDA will provide the sponsor a written explanation of the basis for the hold. Following issuance of a clinical hold or partial clinical hold, an investigation may only resume after the FDA has notified the sponsor that the investigation may proceed. The FDA will base that determination on information provided by the sponsor correcting the deficiencies previously cited or otherwise satisfying the FDA that the investigation can proceed.

A sponsor may choose, but is not required, to conduct a foreign clinical study under an IND. When a foreign clinical study is conducted under an IND, all FDA IND requirements must be met unless waived. When a foreign clinical study is not conducted under an IND, the sponsor must ensure that the study complies with certain regulatory requirements of the FDA in order to use the study as support for an IND or application for marketing approval. Specifically, such studies must be conducted in accordance with GCP including review and approval by an independent ethics committee, or IEC, and informed consent from subjects. The GCP requirements encompass both ethical and data integrity standards for clinical studies. The FDA's regulations are intended to help ensure the protection of human subjects enrolled in non-IND foreign clinical studies, as well as the quality and integrity of the resulting data. They further help ensure that non-IND foreign studies are conducted in a manner comparable to that required for IND studies.

In addition to the foregoing IND requirements, an IRB representing each institution participating in the clinical trial must review and approve the plan for any clinical trial before it commences at that institution, and the IRB must conduct continuing review and reapprove the study at least annually. The IRB must review and approve, among other things, the study protocol and informed consent information to be provided to study subjects. An IRB must operate in compliance with FDA regulations. An IRB can suspend or terminate approval of a clinical trial at its institution, or an institution it represents, if the clinical trial is not being conducted in accordance with the IRB's requirements or if the product candidate has been associated with unexpected serious harm to patients.

Additionally, some trials are overseen by an independent group of qualified experts organized by the trial sponsor, known as a data safety monitoring board or committee, or DSMB. This group provides authorization as to whether or not a trial may move forward at designated check points based on access that only the group maintains to available data from the study. Suspension or termination of development during any phase of clinical trials can occur if it is determined that the participants or patients are being exposed to an unacceptable health risk. Other reasons for suspension or termination may be made by us based on evolving business objectives and/or competitive climate.

Information about clinical trials must be submitted within specific timeframes to the National Institutes of Health, or NIH, for public dissemination on its ClinicalTrials.gov website.

Expanded Access to an Investigational Drug for Treatment Use

Expanded access, sometimes called "compassionate use," is the use of investigational new drug products outside of clinical trials to treat patients with serious or immediately life-threatening diseases or conditions when there are no comparable or satisfactory alternative treatment options. The rules and regulations related to expanded access are intended to improve access to investigational drugs for patients who may benefit from investigational therapies. FDA regulations allow access to investigational drugs under an IND by the company or the treating physician for treatment purposes on a case-by-case basis for: individual patients (single-patient IND applications for treatment in emergency settings and non-emergency settings); intermediate-size patient populations; and larger populations for use of the drug under a treatment protocol or Treatment IND Application.

When considering an IND application for expanded access to an investigational product with the purpose of treating a patient or a group of patients, the sponsor and treating physicians or investigators will determine suitability when all of the following criteria apply: patient(s) have a serious or immediately life-threatening disease or condition, and there is no comparable or satisfactory alternative therapy to diagnose, monitor, or treat the disease or condition; the potential patient benefit justifies the potential risks of the treatment and the potential risks are not unreasonable in the context or condition to be treated; and the expanded use of the investigational drug for the requested treatment will not interfere initiation, conduct, or completion of clinical investigations that could support marketing approval of the product or otherwise compromise the potential development of the product.

On December 13, 2016, the 21st Century Cures Act established (and the 2017 Food and Drug Administration Reauthorization Act later amended) a requirement that sponsors of one or more investigational drugs for the treatment of a serious disease(s) or condition(s) make publicly available their policy for evaluating and responding to requests for expanded access for individual patients. Although these requirements were rolled out over time, they have now come into full effect. This provision requires drug and biologic companies to make publicly available their policies for expanded access for individual patient access to products intended for serious diseases. Sponsors are required to make such policies publicly available upon the earlier of initiation of a Phase 2 or Phase 3 study; or 15 days after the drug or biologic receives designation as a breakthrough therapy, fast track product, or regenerative medicine advanced therapy.

In addition, on May 30, 2018, the Right to Try Act, was signed into law. The law, among other things, provides a federal framework for certain patients to access certain investigational new drug products that have completed a Phase I clinical trial and that are undergoing investigation for FDA approval. Under certain circumstances, eligible patients can seek treatment without enrolling in clinical trials and without obtaining FDA permission under the FDA expanded access program. There is no obligation for a drug manufacturer to make its drug products available to eligible patients as a result of the Right to Try Act, but the manufacturer must develop an internal policy and respond to patient requests according to that policy.

Human Clinical Trials in Support of an NDA

Clinical trials involve the administration of the investigational product candidate to human subjects under the supervision of a qualified investigator in accordance with GCP requirements which include, among other things, the requirement that all research subjects provide their informed consent in writing before their participation in any clinical trial. Clinical trials are conducted under written clinical trial 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.

Human clinical trials are typically conducted in three sequential phases, but the phases may overlap or be combined. Additional studies may also be required after approval.

Phase 1 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 in patients. During Phase 1 clinical trials, information about the investigational drug product's pharmacokinetics and pharmacological effects may be obtained to permit the design of well-controlled and scientifically valid Phase 2 clinical trials.

Phase 2 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 2 clinical trials may be conducted by the sponsor to obtain information prior to beginning larger and more costly Phase 3 clinical trials. Phase 2 clinical trials are well controlled, closely monitored and conducted in a limited patient population.

Phase 3 clinical trials proceed if the Phase 2 clinical trials demonstrate that a dose range of the product candidate is potentially effective and has an acceptable safety profile. Phase 3 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 at multiple, geographically dispersed clinical trial sites. A well-controlled, statistically robust Phase 3 clinical 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 drug: such Phase 3 studies are referred to as "pivotal."

In some cases, the FDA may approve an NDA 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 4 clinical trials. These studies are used to gain additional experience from the treatment of a larger number of patients in the intended treatment group and to further document a clinical benefit in the case of drugs approved under accelerated approval regulations. Failure to exhibit due diligence with regard to conducting Phase 4 clinical trials could result in withdrawal of approval for products.

Progress reports detailing the results of the clinical trials must be submitted at least annually to the FDA and more frequently if serious adverse events occur. In addition, IND safety reports must be submitted to the FDA for any of the following: serious and unexpected suspected adverse reactions; findings from other studies or animal or ***in vitro*** testing that suggest a significant risk in humans exposed to the product; and any clinically important increase in the case of a serious suspected adverse reaction over that listed in the protocol or investigator brochure. Phase 1, Phase 2 and Phase 3 clinical trials may not be completed successfully within any specified period, or at all. Furthermore, the FDA or the sponsor may suspend or terminate a clinical trial at any time on various grounds, including a finding that the research subjects are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution, or an institution it represents, if the clinical trial is not being conducted in accordance with the IRB's requirements or if the product has been associated with unexpected serious harm to patients. The FDA will typically inspect one or more clinical sites to assure compliance with GCP and the integrity of the clinical data submitted.

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

Pediatric Studies

Under the Pediatric Research Equity Act of 2003, an NDA 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.

For drugs intended to treat a serious or life-threatening disease or condition, the FDA must, upon the request of an applicant, meet to discuss preparation of the initial pediatric study plan or to discuss deferral or waiver of pediatric assessments. In addition, the FDA will meet early in the development process to discuss pediatric study plans with sponsors and the FDA must meet with sponsors by no later than the end-of-phase 1 meeting for serious or life-threatening diseases and by no later than ninety (90) days after the FDA's receipt of the study plan.

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 the Food and Drug Administration Safety and Innovation Act, or FDASIA. Unless otherwise required by regulation, the pediatric data requirements do not apply to products with orphan designation.

The FDA Reauthorization Act of 2017 established new requirements to govern certain molecularly targeted cancer indications. Any company that submits an NDA three years after the date of enactment of that statute must submit pediatric assessments with the NDA if the drug is intended for the treatment of an adult cancer and is directed at a molecular target that FDA determines to be substantially relevant to the growth or progression of a pediatric cancer. The investigation must be designed to yield clinically meaningful pediatric study data regarding the dosing, safety and preliminary efficacy to inform pediatric labeling for the product.

Review and Approval of an NDA

In order to obtain approval to market a drug product in the United States, a marketing application must be submitted to the FDA that provides sufficient data establishing the safety and efficacy of the proposed drug product for its intended indication. The application includes all relevant data available from pertinent preclinical studies and clinical trials, including negative or ambiguous results as well as positive findings, together with detailed information relating to the product's chemistry, manufacturing, controls and proposed labeling, among other things. Data can come from company-sponsored clinical trials intended to test the safety and effectiveness of a use of a product, or from a number of alternative sources, including studies initiated by investigators. To support marketing approval, the data submitted must be sufficient in quality and quantity to establish the safety and efficacy of the drug product to the satisfaction of the FDA.

The NDA is a vehicle through which applicants formally propose that the FDA approve a new product for marketing and sale in the United States for one or more indications. Every new drug product candidate must be the subject of an approved NDA before it may be commercialized in the United States. Under federal law, the submission of most NDAs is subject to an application user fee, which for federal fiscal year 2019 is $2,588,478 for an application requiring clinical data. The sponsor of an approved NDA is also subject to an annual prescription drug product program fee, which for fiscal year 2019 is $309,915. Certain exceptions and waivers are available for some of these fees, such as an exception from the application fee for products with orphan designation, an exception from the program fee when the program does not engage in manufacturing the drug during a particular fiscal year and a waiver for certain small businesses.

Following submission of an NDA, the FDA conducts a preliminary review of the application generally within 60 calendar days of its receipt and strives to inform the sponsor by the 74th day after the FDA's receipt of the submission whether the application is sufficiently complete to permit substantive review. The FDA may request additional information rather than accept the application for filing. In this event, the application must be resubmitted with the additional information. The resubmitted application is also subject to review before the FDA accepts it for filing. Once the submission is accepted for filing, the FDA begins an in-depth substantive review. The FDA has agreed to specified performance goals in the review process of NDAs. Under that agreement, 90% of applications seeking approval of New Molecular Entities, or NMEs, are meant to be reviewed within ten months from the date on which the FDA accepts the application for filing, and 90% of applications for NMEs that have been designated for "priority review" are meant to be reviewed within six months of the filing date. For applications seeking approval of products that are not NMEs, the ten-month and six-month review periods run from the date that the FDA receives the application. The review process and the Prescription Drug User Fee Act, or PDUFA, goal date may be extended by the FDA for three additional months to consider new information or clarification provided by the applicant to address an outstanding deficiency identified by the FDA following the original submission.

Before approving an application, the FDA typically will inspect the facility or facilities where the product is or will be manufactured. These pre-approval inspections may cover all facilities associated with an NDA submission, including component manufacturing, finished product manufacturing and control testing laboratories. The FDA will not approve an application unless it determines that the manufacturing processes and facilities are in compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications. Additionally, before approving an NDA, the FDA will typically inspect one or more clinical sites to assure compliance with GCP. Under the FDA Reauthorization Act of 2017, the FDA must implement a protocol to expedite review of responses to inspection reports pertaining to certain applications, including applications for products in shortage or those for which approval is dependent on remediation of conditions identified in the inspection report.

In addition, as a condition of approval, the FDA may require an applicant to develop a REMS. REMS use risk minimization strategies beyond the professional labeling to ensure that the benefits of the product outweigh the potential risks. To determine whether a REMS is needed, the FDA will consider the size of the population likely to use the product, seriousness of the disease, expected benefit of the product, expected duration of treatment, seriousness of known or potential adverse events and whether the product is a new molecular entity.

The FDA may refer an application for a novel product to an advisory committee or explain why such referral was not made. 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.

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, priority review designation and regenerative advanced therapy 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, 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 is a product that 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, or IMM, and that is reasonably likely to predict an effect on irreversible morbidity or mortality or other clinical benefit, taking into account the severity, rarity or prevalence of the condition and the availability or lack of alternative treatments. Products granted accelerated approval must meet the same statutory standards for safety and effectiveness as those granted traditional approval.

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 drug, 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. Thus, the benefit of accelerated approval derives from the potential to receive approval based on surrogate endpoints sooner than possible for trials with clinical or survival endpoints, rather than deriving from any explicit shortening of the FDA approval timeline, as is the case with priority review.

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 4 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 initiate expedited proceedings to withdraw approval of the product. All promotional materials for product candidates approved under accelerated regulations are subject to prior review by the FDA.

The FDA's Decision on an NDA

On the basis of the FDA's evaluation of the application and accompanying information, including the results of the inspection of the manufacturing facilities, the FDA may issue an approval letter or a complete response letter. An approval letter authorizes commercial marketing of the product with specific prescribing information for specific indications. A complete response letter generally outlines the deficiencies in the submission and may require substantial additional testing or information in order for the FDA to reconsider the application. If and when those deficiencies have been addressed to the FDA's satisfaction in a resubmission of the NDA, the FDA will issue an approval letter. The FDA has committed to reviewing such resubmissions in two or six months depending on the type of information included. Even with submission of this additional information, the FDA ultimately may decide that the application does not satisfy the regulatory criteria for approval.

If the FDA approves a new product, it may limit the approved indications for use of the product, require that contraindications, warnings or precautions be included in the product labeling, or require that post-approval studies, including Phase 4 clinical trials, be conducted to further assess the drug'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 health care professionals, and elements to assure safe use, or 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. The FDA may require a REMS before approval or post-approval if it becomes aware of a serious risk associated with use of the product. The requirement for a REMS can materially affect the potential market and profitability of a product. 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.

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 may have imposed as part of the approval process. The sponsor will be required to report, among other things, certain adverse reactions and manufacturing problems to the FDA, provide updated safety and efficacy information and comply with requirements concerning advertising and promotional labeling requirements. 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.

Once an approval is granted, the FDA may withdraw the approval if compliance with regulatory requirements 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 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, complete withdrawal of the product from the market or product recalls;
- fines, warning letters or holds on post-approval clinical trials;
- refusal of the FDA to approve pending applications or supplements to approved applications, or withdrawal of product 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 the marketing, labeling, advertising and promotion of prescription drug products placed on the market. This regulation includes, among other things, standards and regulations for direct-to-consumer advertising, communications regarding unapproved uses, industry-sponsored scientific and educational activities, and promotional activities involving the Internet and social media. Promotional claims about a drug's safety or effectiveness are prohibited before the drug is approved. After approval, a drug product generally may not be promoted for uses that are not approved by the FDA, as reflected in the product's prescribing information. In the United States, health care professionals are generally permitted to prescribe drugs for such uses not described in the drug's labeling, known as off-label uses, because the FDA does not regulate the practice of medicine. However, FDA regulations impose rigorous restrictions on manufacturers' communications, prohibiting the promotion of off-label uses. It may be permissible, under very specific, narrow conditions, for a manufacturer to engage in nonpromotional, non-misleading communication regarding off-label information, such as distributing scientific or medical journal information.

If a company is found to have promoted off-label uses, it may become subject to adverse public relations and administrative and judicial enforcement by the FDA, the Department of Justice, or the Office of the Inspector General of the Department of Health and Human Services, as well as state authorities. This could subject a company to a range of penalties that could have a significant commercial impact, including civil and criminal fines and agreements that materially restrict the manner in which a company promotes or distributes drug products. The federal government has levied large civil and criminal fines against companies for alleged improper promotion, and has also requested that companies enter into consent decrees or permanent injunctions under which specified promotional conduct is changed or curtailed.

In addition, the distribution of prescription pharmaceutical products is subject to the Prescription Drug Marketing Act, or PDMA, and its implementing regulations, as well as the Drug Supply Chain Security Act, or DSCA, which regulate the distribution and tracing of prescription drug samples at the federal level, and set minimum standards for the regulation of distributors by the states. The PDMA, its implementing regulations and state laws limit the distribution of prescription pharmaceutical product samples, and the DSCA imposes requirements to ensure accountability in distribution and to identify and remove counterfeit and other illegitimate products from the market.

Section 505(b)(2) NDAs

NDAs for most new drug products are based on two full clinical studies which must contain substantial evidence of the safety and efficacy of the proposed new product for the proposed use. These applications are submitted under Section 505(b)(1) of the FDCA. The FDA is, however, authorized to approve an alternative type of NDA under Section 505(b)(2) of the FDCA. This type of application allows the applicant to rely, in part, on the FDA's previous findings of safety and efficacy for a similar product, or published literature. Specifically, Section 505(b)(2) applies to NDAs for a drug for which the investigations made to show whether or not the drug is safe for use and effective in use and relied upon by the applicant for approval of the application "were not conducted by or for the applicant and for which the applicant has not obtained a right of reference or use from the person by or for whom the investigations were conducted."

Thus, Section 505(b)(2) authorizes the FDA to approve an NDA based on safety and effectiveness data that were not developed by the applicant. NDAs filed under Section 505(b)(2) may provide an alternate and potentially more expeditious pathway to FDA approval for new or improved formulations or new uses of previously approved products. If the 505(b)(2) applicant can establish that reliance on the FDA's previous approval is scientifically appropriate, the applicant may eliminate the need to conduct certain preclinical or clinical studies of the new product. The FDA may also require companies to perform additional studies or measurements to support the change from the approved product. The FDA may then approve the new drug candidate for all or some of the label indications for which the referenced product has been approved, as well as for any new indication sought by the Section 505(b)(2) applicant.

Abbreviated New Drug Applications for Generic Drugs

In 1984, with passage of the Hatch-Waxman Amendments to the FDCA, Congress established an abbreviated regulatory scheme authorizing the FDA to approve generic drugs that are shown to contain the same active ingredients as, and to be bioequivalent to, drugs previously approved by the FDA pursuant to NDAs. To obtain approval of a generic drug, an applicant must submit an abbreviated new drug application, or ANDA, to the agency. An ANDA is a comprehensive submission that contains, among other things, data and information pertaining to the active pharmaceutical ingredient, bioequivalence, drug product formulation, specifications and stability of the generic drug, as well as analytical methods, manufacturing process validation data and quality control procedures. ANDAs are "abbreviated" because they generally do not include preclinical and clinical data to demonstrate safety and effectiveness. Instead, in support of such applications, a generic manufacturer may rely on the preclinical and clinical testing previously conducted for a drug product previously approved under an NDA, known as the reference-listed drug, or RLD.

Specifically, in order for an ANDA to be approved, the FDA must find that the generic version is identical to the RLD with respect to the active ingredients, the route of administration, the dosage form, the strength of the drug and the conditions of use of the drug. At the same time, the FDA must also determine that the generic drug is "bioequivalent" to the innovator drug. Under the statute, a generic drug is bioequivalent to a RLD if "the rate and extent of absorption of the drug do not show a significant difference from the rate and extent of absorption of the listed drug." Upon approval of an ANDA, the FDA indicates whether the generic product is "therapeutically equivalent" to the RLD in its publication "Approved Drug Products with Therapeutic Equivalence Evaluations," also referred to as the "Orange Book." Physicians and pharmacists consider a therapeutic equivalent generic drug to be fully substitutable for the RLD. In addition, by operation of certain state laws and numerous health insurance programs, the FDA's designation of therapeutic equivalence often results in substitution of the generic drug without the knowledge or consent of either the prescribing physician or patient.

Under the Hatch-Waxman Amendments, the FDA may not approve an ANDA until any applicable period of non-patent exclusivity for the RLD has expired. The FDCA provides a period of five years of non-patent data exclusivity for a new drug containing a new chemical entity. For the purposes of this provision, a new chemical entity, or NCE, is a drug that contains no active moiety that has previously been approved by the FDA in any other NDA. An active moiety is the molecule or ion responsible for the physiological or pharmacological action of the drug substance. In cases where such NCE exclusivity has been granted, an ANDA may not be filed with the FDA until the expiration of five years unless the submission is accompanied by a Paragraph IV certification, in which case the applicant may submit its application four years following the original product approval.

The FDCA also provides for a period of three years of exclusivity if the NDA includes reports of one or more new clinical investigations, other than bioavailability or bioequivalence studies, that were conducted by or for the applicant and are essential to the approval of the application. This three-year exclusivity period often protects changes to a previously approved drug product, such as a new dosage form, route of administration, combination or indication. Three-year exclusivity would be available for a drug product that contains a previously approved active moiety, provided the statutory requirement for a new clinical investigation is satisfied. Unlike five-year NCE exclusivity, an award of three-year exclusivity does not block the FDA from accepting ANDAs seeking approval for generic versions of the drug as of the date of approval of the original drug product. The FDA typically makes decisions about awards of data exclusivity shortly before a product is approved.

The FDA must establish a priority review track for certain generic drugs, requiring the FDA to review a drug application within eight (8) months for a drug that has three (3) or fewer approved drugs listed in the Orange Book and is no longer protected by any patent or regulatory exclusivities, or is on the FDA's drug shortage list. The FDA is also authorized to expedite review of "competitor generic therapies" or drugs with inadequate generic competition, including holding meetings with or providing advice to the drug sponsor prior to submission of the application.

Hatch-Waxman Patent Certification and the 30-Month Stay

Upon approval of an NDA or a supplement thereto, NDA sponsors are required to list with the FDA each patent with claims that cover the applicant's product or an approved method of using the product. Each of the patents listed by the NDA sponsor is published in the Orange Book. When an ANDA applicant files its application with the FDA, the applicant is required to certify to the FDA concerning any patents listed for the reference product in the Orange Book, except for patents covering methods of use for which the ANDA applicant is not seeking approval. To the extent that the Section 505(b)(2) applicant is relying on studies conducted for an already approved product, the applicant is required to certify to the FDA concerning any patents listed for the approved product in the Orange Book to the same extent that an ANDA applicant would.

Specifically, the applicant must certify with respect to each patent that:

- the required patent information has not been filed;
- the listed patent has expired;
- the listed patent has not expired, but will expire on a particular date and approval is sought after patent expiration; or
- the listed patent is invalid, unenforceable or will not be infringed by the new product.

A certification that the new product will not infringe the already approved product's listed patents or that such patents are invalid or unenforceable is called a Paragraph IV certification. If the applicant does not challenge the listed patents or indicates that it is not seeking approval of a patented method of use, the application will not be approved until all the listed patents claiming the referenced product have expired (other than method of use patents involving indications for which the applicant is not seeking approval).

If the ANDA applicant has provided a Paragraph IV certification to the FDA, the applicant must also send notice of the Paragraph IV certification to the NDA and patent holders once the ANDA has been accepted for filing by the FDA. The NDA and patent holders may then initiate a patent infringement lawsuit in response to the notice of the Paragraph IV certification. The filing of a patent infringement lawsuit within 45 days after the receipt of a Paragraph IV certification automatically prevents the FDA from approving the ANDA until the earlier of 30 months after the receipt of the Paragraph IV notice, expiration of the patent, or a decision in the infringement case that is favorable to the ANDA applicant.

To the extent that the Section 505(b)(2) applicant is relying on studies conducted for an already approved product, the applicant is required to certify to the FDA concerning any patents listed for the approved product in the Orange Book to the same extent that an ANDA applicant would. As a result, approval of a Section 505(b)(2) NDA can be stalled until all the listed patents claiming the referenced product have expired, until any non-patent exclusivity, such as exclusivity for obtaining approval of a new chemical entity, listed in the Orange Book for the referenced product has expired, and, in the case of a Paragraph IV certification and subsequent patent infringement suit, until the earlier of 30 months, settlement of the lawsuit or a decision in the infringement case that is favorable to the Section 505(b)(2) applicant.

Pediatric Exclusivity

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 and orphan exclusivity. This six-month exclusivity may be granted if an NDA 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.

Orphan Drug Designation and Exclusivity

Under the Orphan Drug Act, the FDA may designate a drug product as an "orphan drug" if it is intended to treat a rare disease or condition, generally meaning that it affects fewer than 200,000 individuals in the United States, or more in cases in which there is no reasonable expectation that the cost of developing and making a product available in the United States for treatment of the disease or condition will be recovered from sales of the product. A company must seek orphan drug designation before submitting an NDA for the candidate product. If the request is granted, the FDA will disclose the identity of the therapeutic agent and its potential use. Orphan drug designation does not shorten the PDUFA goal dates for the regulatory review and approval process, although it does convey certain advantages such as tax benefits and exemption from the PDUFA application fee.

If a product with orphan designation receives the first FDA approval for the disease or condition for which it has such designation or for a select indication or use within the rare disease or condition for which it was designated, the product generally will receive orphan drug exclusivity. Orphan drug exclusivity means that the FDA may not approve another sponsor's marketing application for the same drug for the same condition for seven years, except in certain limited circumstances. Orphan exclusivity does not block the approval of a different product for the same rare disease or condition, nor does it block the approval of the same product for different conditions. If a drug designated as an orphan drug ultimately receives marketing approval for an indication broader than what was designated in its orphan drug application, it may not be entitled to exclusivity.

Orphan drug exclusivity will not bar approval of another product under certain circumstances, including if a subsequent product with the same drug for the same condition is shown to be clinically superior to the approved product on the basis of greater efficacy or safety, or providing a major contribution to patient care, or if the company with orphan drug exclusivity is not able to meet market demand. This is the case despite an earlier court opinion holding that the Orphan Drug Act unambiguously required the FDA to recognize orphan exclusivity regardless of a showing of clinical superiority.

Patent Term Restoration and Extension

A patent claiming a new drug product may be eligible for a limited patent term extension under the Hatch-Waxman Act, which permits a patent restoration of up to five years for patent term lost during product development and the FDA regulatory review. The restoration period granted on a patent covering a product is typically one-half the time between the effective date of a clinical investigation involving human beings is begun and the submission date of an application, plus the time between the submission date of an application 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 United States Patent and Trademark Office reviews and approves the application for any patent term extension or restoration in consultation with the FDA.

Health Care Law and Regulation

Health care providers and third-party payors play a primary role in the recommendation and prescription of drug products that are granted marketing approval. Arrangements with providers, consultants, third-party payors and customers are subject to broadly applicable state and federal fraud and abuse laws and regulations (including anti-kickback and false claims laws), patient privacy laws and regulations, and other health care laws and regulations that may constrain business and/or financial arrangements. Restrictions under applicable federal and state health care laws and regulations, include the following:

- the federal Anti-Kickback Statute, which prohibits, among other things, persons and entities from knowingly and willfully soliciting, offering, paying, or receiving remuneration, directly or indirectly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchasing, ordering, leasing, arranging for, or recommending the purchasing, ordering, or leasing of, any good or service for which payment may be made, in whole or in part, under a federal health care program such as Medicare and Medicaid;
- the federal civil and criminal false claims laws, including the civil False Claims Act, and Civil Monetary Penalties Law, which prohibit individuals or entities from, among other things, knowingly presenting, or causing to be presented, to the federal government, false or fraudulent claims for payment or knowingly making, using or causing to made or used a false record or statement material to a false or fraudulent claim or to avoid, decrease or conceal an obligation to pay money to the federal government;
- the federal Health Insurance Portability and Accountability Act of 1996, or 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 health care benefit program or making false statements relating to health care matters;
- the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, and the regulations promulgated thereunder, including 45 C.F.R. Parts 160 and 164, imposing rules regarding privacy, security, and data breach notifications;
- the Foreign Corrupt Practices Act, or FCPA, which prohibits companies and their intermediaries from making, or offering or promising to make improper payments to non-U.S. officials for the purpose of obtaining or retaining business or otherwise seeking favorable treatment;
- the federal physician transparency requirements known as the Physician Payments Sunshine Act, under the Patient Protection and Affordable Care Act, as amended by the Health Care Education Reconciliation Act, or the Affordable Care Act (ACA), which requires manufacturers of drugs, medical devices, biological and medical supplies covered by Medicare, Medicaid, or State Children's Health Insurance Program (CHIP) to report annually to the Centers for Medicare & Medicaid Services, or CMS, within the United States Department of Health and Human Services, 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 health care items or services that are reimbursed by non-government third-party payors, including private insurers.

Further, 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 manufacturers to report information related to payments to physicians and other health care providers or marketing expenditures. Additionally, some state and local laws require the registration of pharmaceutical sales representatives in the jurisdiction. 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.

Pharmaceutical Insurance Coverage and Health Care Reform

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 health care costs. Significant uncertainty exists as to the coverage and reimbursement status of products approved by the FDA and other government authorities. Thus, even if a product candidate is approved, sales of the product 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 the product. 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 marketing approvals. Nonetheless, product candidates may not be considered medically necessary or cost effective. A decision by a third-party payor not to cover a product could reduce physician utilization once the product is approved and have a material adverse effect on 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.

The containment of health care costs also has become a priority of federal, state and foreign governments and the prices of products 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 marketing approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

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 biologics and other medical products, government control and other changes to the health care system in the United States.

In March 2010, the United States Congress enacted the ACA, which, among other things, includes changes to the coverage and payment for drug products under government health care 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 agents, 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," or AMP, for calculating and reporting Medicaid drug rebates on outpatient prescription drug prices;
- addressed a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted or injected;
- 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% (and 70% starting January 1, 2019) point-of-sale-discount off the negotiated price of applicable brand drugs to eligible beneficiaries during their coverage gap period as a condition for the manufacturers' outpatient drugs to be covered under Medicare Part D; and
- a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research.

Other legislative changes have been proposed and adopted in the United States since the ACA 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 $1.5 trillion over a ten-year period, was unable to reach required goals, thereby triggering the legislation's automatic $1.2 trillion reduction to several government programs. This includes aggregate reductions of Medicare payments to providers up to 2% per fiscal year, which went into effect in April 2013 and, due to subsequent legislative amendments, will remain in effect through 2027 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.

Since enactment of the ACA, there have been numerous legal challenges and Congressional actions to repeal and replace provisions of the law. For example, with enactment of the Tax Cuts and Jobs Act of 2017, which was signed by President Trump on December 22, 2017, Congress repealed the "individual mandate." The repeal of this provision, which requires most Americans to carry a minimal level of health insurance, became effective on January 1, 2019. According to the Congressional Budget Office, the repeal of the individual mandate will cause 13 million fewer Americans to be insured in 2027 and premiums in insurance markets may rise. Additionally, on January 22, 2018, President Trump signed a continuing resolution on appropriations for fiscal year 2018 that delayed the implementation of certain ACA-mandated fees, including the so-called "Cadillac" tax on certain high cost employer-sponsored insurance plans, the annual fee imposed on certain health insurance providers based on market share, and the medical device excise tax on non-exempt medical devices. Further, the Bipartisan Budget Act of 2018, among other things, amends the ACA, effective January 1, 2019, to increase from 50 percent to 70 percent the point-of-sale discount that is owed by pharmaceutical manufacturers who participate in Medicare Part D and to close the coverage gap in most Medicare drug plans, commonly referred to as the "donut hole." The Congress will likely consider other legislation to replace elements of the ACA during the next Congressional session.

The Trump Administration has also taken executive actions to undermine or delay implementation of the ACA. Since January 2017, President Trump has signed two Executive Orders designed to delay the implementation of certain provisions of the ACA or otherwise circumvent some of the requirements for health insurance mandated by the ACA. One Executive Order directs 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 or regulatory burden on states, individuals, healthcare providers, health insurers, or manufacturers of pharmaceuticals or medical devices. The second Executive Order terminates the cost-sharing subsidies that reimburse insurers under the ACA. 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 ACA for plans sold through such marketplaces. Further, on June 14, 2018, U.S. Court of Appeals for the Federal Circuit ruled that the federal government was not required to pay more than $12 billion in ACA risk corridor payments to third-party payors who argued were owed to them. The effects of this gap in reimbursement on third-party payors, the viability of the ACA marketplace, providers, and potentially our business, are not yet known.

Further, there have been several recent U.S. congressional inquiries and proposed federal and proposed and enacted state legislation designed to, among other things, bring more transparency to drug pricing, review the relationship between pricing and manufacturer patient programs, reduce the costs of drugs under Medicare and reform government program reimbursement methodologies for drug products. For example, there have been several recent U.S. congressional inquiries and proposed federal and proposed and enacted state legislation designed to, among other things, bring more transparency to drug pricing, review the relationship between pricing and manufacturer patient programs, reduce the costs of drugs under Medicare and reform government program reimbursement methodologies for drug products. At the federal level, Congress and the Trump administration have each indicated that it will continue to seek new legislative and/or administrative measures to control drug costs.

For example, on May 11, 2018, the Administration issued a plan to lower drug prices. Under this blueprint for action, the Administration indicated that the Department of Health and Human Services, or HHS, will: take steps to end the gaming of regulatory and patent processes by drug makers to unfairly protect monopolies; advance biosimilars and generics to boost price competition; evaluate the inclusion of prices in drug makers' ads to enhance price competition; speed access to and lower the cost of new drugs by clarifying policies for sharing information between insurers and drug makers; avoid excessive pricing by relying more on value-based pricing by expanding outcome-based payments in Medicare and Medicaid; work to give Part D plan sponsors more negotiation power with drug makers; examine which Medicare Part B drugs could be negotiated for a lower price by Part D plans, and improving the design of the Part B Competitive Acquisition Program; update Medicare's drug-pricing dashboard to increase transparency; prohibit Part D contracts that include "gag rules" that prevent pharmacists from informing patients when they could pay less out-of-pocket by not using insurance; and require that Part D plan members be provided with an annual statement of plan payments, out-of-pocket spending, and drug price increases. More recently, on January 31, 2019, the HHS Office of Inspector General proposed modifications to the federal Anti-Kickback Statute discount safe harbor for the purpose of reducing the cost of drug products to consumers which, among other things, if finalized, will affect discounts paid by manufacturers to Medicare Part D plans, Medicaid managed care organizations and pharmacy benefit managers working with these organizations.

At the state level, individual states are increasingly aggressive in passing legislation and implementing regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. In addition, regional health care authorities and individual hospitals are increasingly using bidding procedures to determine what pharmaceutical products and which suppliers will be included in their prescription drug and other health care programs. These measures could reduce the ultimate demand for our products, once approved, or put pressure on our product pricing. We expect that additional state and federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, which could result in reduced demand for our product candidates or additional pricing pressures.

Review and Approval of Medicinal Products in the European Union

In order to market any product outside of the United States, a company must also 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 non-U.S. regulatory authorities before it can commence clinical trials or marketing of the product in those countries or jurisdictions. The approval process ultimately varies between countries and jurisdictions and can involve additional product testing and additional administrative review periods. The time required to obtain approval in other countries and jurisdictions might differ from and be longer than that required to obtain FDA approval. Regulatory approval in one country or jurisdiction does not ensure regulatory approval in another, but a failure or delay in obtaining regulatory approval in one country or jurisdiction may negatively impact the regulatory process in others. Specifically, however, the process governing approval of medicinal products in the European Union, or EU, generally follows the same lines as in the United States. It entails satisfactory completion of preclinical 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, or MAA, and granting of a marketing authorization by these authorities before the product can be marketed and sold in the EU.

Clinical Trial Approval

The Clinical Trials Directive 2001/20/EC, the Directive 2005/28/EC on GCP and the related national implementing provisions of the individual member states of the European Union, or EU Member States, govern the system for the approval of clinical trials in the EU. Under this system, an applicant must obtain prior approval from the competent national authority of the EU Member States in which the clinical trial is to be conducted. Furthermore, the applicant may only start a clinical trial at a specific study site after the competent ethics committee has issued a favorable opinion. The clinical trial application must be accompanied by, among other documents, an investigational medicinal product dossier (the Common Technical Document) with supporting information prescribed by Directive 2001/20/EC, Directive 2005/28/EC, where relevant the implementing national provisions of the individual EU Member States and further detailed in applicable guidance documents.

In April 2014, the new Clinical Trials Regulation, (EU) No 536/2014, was adopted. The Clinical Trials Regulation was published on June 16, 2014 but is not expected to apply until later in 2019. The Clinical Trials Regulation will be directly applicable in all the EU Member States, repealing the current Clinical Trials Directive 2001/20/EC and replacing any national legislation that was put in place to implement the Directive. Conduct of all clinical trials performed in the EU will continue to be bound by currently applicable provisions until the new Clinical Trials Regulation becomes applicable. The extent to which ongoing clinical trials will be governed by the Clinical Trials Regulation will depend on when the Clinical Trials Regulation becomes applicable and on the duration of the individual clinical trial. If a clinical trial continues for more than three years from the day on which the Clinical Trials Regulation becomes applicable the Clinical Trials Regulation will at that time begin to apply to the clinical trial.

The new Clinical Trials Regulation aims to simplify and streamline the approval of clinical trials in the EU. The main characteristics of the regulation include: a streamlined application procedure via a single entry point, the "EU Portal and Database"; a single set of documents to be prepared and submitted for the application as well as simplified reporting procedures for clinical trial sponsors; and a harmonized procedure for the assessment of applications for clinical trials, which is divided in two parts. Part I is assessed by the appointed reporting Member State, whose assessment report is submitted for review by the sponsor and all other competent authorities of all EU Member States in which an application for authorization of a clinical trial has been submitted (Concerned Member States). Part II is assessed separately by each Concerned Member State. Strict deadlines have been established for the assessment of clinical trial applications. The role of the relevant ethics committees in the assessment procedure will continue to be governed by the national law of the Concerned Member State. However, overall related timelines will be defined by the Clinical Trials Regulation.

As in the United States, similar requirements for posting clinical trial information are present in other countries; for the members of the European Union, the website EudraCT can be found at: https://eudract.ema.europa.eu/.

PRIME Designation in the EU

In March 2016, the European Medicines Agency, or EMA, launched an initiative to facilitate development of product candidates in indications, often rare, for which few or no therapies currently exist. The PRIority MEdicines, or PRIME, scheme is intended to encourage drug development in areas of unmet medical need and provides accelerated assessment of products representing substantial innovation reviewed under the centralized procedure. Products from small- and medium-sized enterprises, or SMEs, may qualify for earlier entry into the PRIME scheme than larger companies. Many benefits accrue to sponsors of product candidates with PRIME designation, including but not limited to, early and proactive regulatory dialogue with the EMA, frequent discussions on clinical trial designs and other development program elements, and accelerated marketing authorization application assessment once a dossier has been submitted. Importantly, a dedicated Agency contact and rapporteur from the Committee for Human Medicinal Products, or CHMP, or Committee for Advanced Therapies, or CAT, are appointed early in PRIME scheme facilitating increased understanding of the product at EMA's Committee level. A kick-off meeting initiates these relationships and includes a team of multidisciplinary experts at the EMA to provide guidance on the overall development and regulatory strategies.

Marketing Authorization

To obtain a marketing authorization for a product under EU regulatory systems, an applicant must submit an MAA either under a centralized procedure administered by the EMA, or one of the procedures administered by competent authorities in the EU Member States (decentralized 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, applicants have to demonstrate compliance with all measures included in an EMA-approved Paediatric Investigation Plan, or PIP, covering all subsets of the pediatric population, unless the EMA has granted (1) a product-specific waiver, (2) a class waiver or (3) 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 across the European Economic Area (i.e. the EU as well as Iceland, Liechtenstein and Norway). Pursuant to Regulation (EC) No 726/2004, the centralized procedure is compulsory for specific products, including for medicines produced by certain biotechnological processes, products designated as orphan medicinal products, advanced therapy medicinal products (ATMPs) 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. The centralized procedure may at the request of the applicant also be used in certain other cases.

Under the centralized procedure, the CHMP is responsible for conducting the initial assessment of a product and for several post-authorization and maintenance activities, such as the assessment of modifications or extensions to an existing marketing authorization. Under the centralized procedure in the EU, 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 might 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 request, the time limit of 210 days will be reduced to 150 days but it is possible that the CHMP can revert to the standard time limit for the centralized procedure if it considers that it is no longer appropriate to conduct an accelerated assessment. At the end of this period, the CHMP provides a scientific opinion on whether or not a marketing authorization should be granted in relation to a medicinal product. Within 15 calendar days of receipt of a final opinion from the CHMP, the European Commission must prepare a draft decision concerning an application for marketing authorization. This draft decision must take the opinion and any relevant provisions of EU law into account. Before arriving at a final decision on an application for centralized authorization of a medicinal product the European Commission must consult the Standing Committee on Medicinal Products for Human Use. The Standing Committee is composed of representatives of the EU Member States and chaired by a non-voting European Commission representative. The European Parliament also has a related "droit de regard." The European Parliament's role is to ensure that the European Commission has not exceeded its powers in deciding to grant or refuse to grant a marketing authorization.

The European Commission may grant a so-called "marketing authorization under exceptional circumstances." Such authorization is intended for products for which the applicant can demonstrate that it is unable to provide comprehensive data on the efficacy and safety under normal conditions of use, because the indications for which the product in question is intended are encountered so rarely that the applicant cannot reasonably be expected to provide comprehensive evidence, or in the present state of scientific knowledge, comprehensive information cannot be provided, or it would be contrary to generally accepted principles of medical ethics to collect such information. Consequently, marketing authorization under exceptional circumstances may be granted subject to certain specific obligations, which may include the following:

- the applicant must complete an identified program of studies within a time period specified by the competent authority, the results of which form the basis of a reassessment of the benefit/risk profile;
- the medicinal product in question may be supplied on medical prescription only and may in certain cases be administered only under strict medical supervision, possibly in a hospital and in the case of a radiopharmaceutical, by an authorized person; and
- the package leaflet and any medical information must draw the attention of the medical practitioner to the fact that the particulars available concerning the medicinal product in question are as yet inadequate in certain specified respects.

A marketing authorization under exceptional circumstances is subject to annual review to reassess the risk-benefit balance in an annual reassessment procedure. Continuation of the authorization is linked to the annual reassessment and a negative assessment could potentially result in the marketing authorization being suspended or revoked. The renewal of a marketing authorization of a medicinal product under exceptional circumstances, however, follows the same rules as a "normal" marketing authorization. Thus, a marketing authorization under exceptional circumstances is granted for an initial five years, after which the authorization will become valid indefinitely, unless the EMA decides that safety grounds merit one additional five-year renewal.

The European Commission may also grant a so-called "conditional marketing authorization" prior to obtaining the comprehensive clinical data required for an application for a full marketing authorization. Such conditional marketing authorizations may be granted for product candidates (including medicines designated as orphan medicinal products), if (i) the risk-benefit balance of the product candidate is positive, (ii) it is likely that the applicant will be in a position to provide the required comprehensive clinical trial data, (iii) the product fulfills an unmet medical need and (iv) the benefit to public health of the immediate availability on the market of the medicinal product concerned outweighs the risk inherent in the fact that additional data are still required. A conditional marketing authorization may contain specific obligations to be fulfilled by the marketing authorization holder, including obligations with respect to the completion of ongoing or new studies, and with respect to the collection of pharmacovigilance data. Conditional marketing authorizations are valid for one year, and may be renewed annually, if the risk-benefit balance remains positive, and after an assessment of the need for additional or modified conditions and/or specific obligations. The timelines for the centralized procedure described above also apply with respect to the review by the CHMP of applications for a conditional marketing authorization.

The EU medicines rules expressly permit the EU Member States to adopt national legislation prohibiting or restricting the sale, supply or use of any medicinal product containing, consisting of or derived from a specific type of human or animal cell, such as embryonic stem cells. While the products we have in development do not make use of embryonic stem cells, it is possible that the national laws in certain EU Member States may prohibit or restrict us from commercializing our products, even if they have been granted an EU marketing authorization.

Unlike the centralized authorization procedure, the decentralized marketing authorization procedure requires a separate application to, and leads to separate approval by, the competent authorities of each EU Member State in which the product is to be marketed. This application is identical to the application that would be submitted to the EMA for authorization through the centralized procedure. The reference EU Member State prepares a draft assessment and drafts of the related materials within 120 days after receipt of a valid application. The resulting assessment report is submitted to the concerned EU Member States who, within 90 days of receipt, must decide whether to approve the assessment report and related materials. If a concerned EU Member State cannot approve the assessment report and related materials due to concerns relating to a potential serious risk to public health, disputed elements may be referred to the European Commission, whose decision is binding on all EU Member States.

The mutual recognition procedure similarly is based on the acceptance by the competent authorities of the EU Member States of the marketing authorization of a medicinal product by the competent authorities of other EU Member States. The holder of a national marketing authorization may submit an application to the competent authority of an EU Member State requesting that this authority recognize the marketing authorization delivered by the competent authority of another EU Member State.

Regulatory Data Protection in the EU

In the EU, innovative medicinal products 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 Directive 2001/83/EC. Regulation (EC) No 726/2004 repeats this entitlement for medicinal products authorized in accordance the centralized authorization procedure. Data exclusivity prevents applicants for authorization of generics of these innovative products from referencing the innovator's data to assess a generic (abridged) application for a period of eight years. During an additional two-year period of market exclusivity, a generic marketing authorization application can be submitted and authorized, and the innovator's data may be referenced, but no generic medicinal product can be placed on the EU market 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 their authorization, are 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 nevertheless could also 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, preclinical tests and clinical trials.

Periods of Authorization and Renewals

A marketing authorization has an initial validity for five years in principle. The marketing authorization may be renewed after five years on the basis of a re-evaluation of the risk-benefit balance by the EMA or by the competent authority of the EU Member State. To this 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. The European Commission or the competent authorities of the EU Member States may decide, on justified grounds relating to pharmacovigilance, to proceed with one further five-year period of marketing authorization. Once subsequently definitively renewed, the marketing authorization shall be valid for an unlimited period. Any authorization which is not followed by the actual placing of the medicinal product on the EU market (in case of centralized procedure) or on the market of the authorizing EU Member State within three years after authorization ceases to be valid (the so-called sunset clause).

Pediatric Studies and Exclusivity

Prior to obtaining a marketing authorization in the European Union, applicants must demonstrate compliance with all measures included in an EMA-approved PIP covering all subsets of the pediatric population, unless the EMA has granted a product-specific waiver, a class waiver, or a deferral for one or more of the measures included in the PIP. The respective requirements for all marketing authorization procedures are laid down in Regulation (EC) No 1901/2006, the so-called Paediatric Regulation. This requirement also applies when a company wants to add a new indication, pharmaceutical form or route of administration for a medicine that is already authorized. The Paediatric Committee of the EMA, or PDCO, may grant deferrals for some medicines, allowing a company to delay development of the medicine for children until there is enough information to demonstrate its effectiveness and safety in adults. The PDCO may also grant waivers when development of a medicine for children is not needed or is not appropriate, such as for diseases that only affect the elderly population. Before an MAA can be filed, or an existing marketing authorization can be amended, the EMA determines that companies actually comply with the agreed studies and measures listed in each relevant PIP. If an applicant obtains a marketing authorization in all EU Member States, or a marketing authorization granted in the centralized procedure by the European Commission, and the study results for the pediatric population are included in the product information, even when negative, the medicine is then eligible for an additional six-month period of qualifying patent protection through extension of the term of the Supplementary Protection Certificate, or SPC.

Orphan Drug Designation and Exclusivity

Regulation (EC) No. 141/2000, as implemented by Regulation (EC) No. 847/2000 provides that a drug can be designated as an orphan drug by the European Commission if its sponsor can establish: that the product is intended for the diagnosis, prevention or treatment of (1) a life-threatening or chronically debilitating condition affecting not more than five in ten thousand persons in the EU when the application is made, or (2) a life-threatening, seriously debilitating or serious and chronic condition in the EU and that without incentives it is unlikely that the marketing of the drug in the EU would generate sufficient return to justify the necessary investment. For either of these conditions, the applicant must demonstrate that there exists no satisfactory method of diagnosis, prevention or treatment of the condition in question that has been authorized in the EU or, if such method exists, the drug will be of significant benefit to those affected by that condition.

Once authorized, orphan medicinal products are entitled to 10 years of market exclusivity in all EU Member States and in addition a range of other benefits during the development and regulatory review process including scientific assistance for study protocols, authorization through the centralized marketing authorization procedure covering all member countries and a reduction or elimination of registration and marketing authorization fees. However, marketing authorization may be granted to a similar medicinal product with the same orphan indication during the 10-year period with the consent of the marketing authorization holder for the original orphan medicinal product or if the manufacturer of the original orphan medicinal product is unable to supply sufficient quantities. Marketing authorization may also be granted to a similar medicinal product with the same orphan indication if this product is safer, more effective or otherwise clinically superior to the original orphan medicinal product. The period of market exclusivity may, in addition, be reduced to six years if it can be demonstrated on the basis of available evidence that the original orphan medicinal product is sufficiently profitable not to justify maintenance of market exclusivity.

Regulatory Requirements after a Marketing Authorization has been Obtained

In case an authorization for a medicinal product in the EU is obtained, the holder of the marketing authorization is required to comply with a range of requirements applicable to the manufacturing, marketing, promotion and sale of medicinal products. These include:

- Compliance with the EU's stringent pharmacovigilance or safety reporting rules must be ensured. These rules can impose post-authorization studies and additional monitoring obligations.
- The manufacturing of authorized medicinal products, for which a separate manufacturer's license is mandatory, must also be conducted in strict compliance with the applicable EU laws, regulations and guidance, including Directive 2001/83/EC, Directive 2003/94/EC, Regulation (EC) No 726/2004 and the European Commission Guidelines for Good Manufacturing Practice. These requirements include compliance with EU cGMP standards when manufacturing medicinal products and active pharmaceutical ingredients, including the manufacture of active pharmaceutical ingredients outside of the EU with the intention to import the active pharmaceutical ingredients into the EU.
- The marketing and promotion of authorized drugs, including industry-sponsored continuing medical education and advertising directed toward the prescribers of drugs and/or the general public, are strictly regulated in the EU notably under Directive 2001/83EC, as amended, and are also subject to EU Member State laws. Direct-to-consumer advertising of prescription medicines is prohibited across the EU.

Brexit and the Regulatory Framework in the United Kingdom

On June 23, 2016, the electorate in the United Kingdom voted in favor of leaving the EU (commonly referred to as "Brexit"). Thereafter, on March 29, 2017, the country formally notified the EU of its intention to withdraw pursuant to Article 50 of the Lisbon Treaty. The withdrawal of the United Kingdom from the EU will take effect either on the effective date of the withdrawal agreement or, in the absence of agreement, two years after the United Kingdom provides a notice of withdrawal pursuant to the EU Treaty. Since the regulatory framework for pharmaceutical products in the United Kingdom. covering quality, safety and efficacy of pharmaceutical products, clinical trials, marketing authorization, commercial sales and distribution of pharmaceutical products is derived from EU directives and regulations, Brexit could materially impact the future regulatory regime which applies to products and the approval of product candidates in the United Kingdom. It remains to be seen how, if at all, Brexit will impact regulatory requirements for product candidates and products in the United Kingdom.

The United Kingdom has a period of a maximum of two years from the date of its formal notification to negotiate the terms of its withdrawal from, and future relationship with, the European Union. If no formal withdrawal agreement is reached between the United Kingdom and the European Union, then it is expected the United Kingdom's membership of the European Union will automatically terminate two years after the submission of the notification of the United Kingdom's intention to withdraw from the European Union. Discussions between the United Kingdom and the European Union focused on finalizing withdrawal issues and transition agreements are ongoing. However, limited progress to date in these negotiations and ongoing uncertainty within the UK Government and Parliament sustains the possibility of the United Kingdom leaving the European Union on March 29, 2019 without a withdrawal agreement and associated transition period in place, which is likely to cause significant market and economic disruption.

General Data Protection Regulation

The collection, use, disclosure, transfer, or other processing of personal data regarding individuals in the EU, including personal health data, is subject to the EU General Data Protection Regulation, or GDPR, which became effective on May 25, 2018. The GDPR is wide-ranging in scope and imposes numerous requirements on companies that process personal data, including requirements relating to processing health and other sensitive data, obtaining consent of the individuals to whom the personal data relates, providing information to individuals regarding data processing activities, implementing safeguards to protect the security and confidentiality of personal data, providing notification of data breaches, and taking certain measures when engaging third-party processors. The GDPR also imposes strict rules on the transfer of personal data to countries outside the EU, including the U.S., and permits data protection authorities to impose large penalties for violations of the GDPR, including potential fines of up to €20 million or 4% of annual global revenues, whichever is greater. The GDPR also confers a private right of action on data subjects and consumer associations to lodge complaints with supervisory authorities, seek judicial remedies, and obtain compensation for damages resulting from violations of the GDPR. Compliance with the GDPR will be a rigorous and time-intensive process that may increase the cost of doing business or require companies to change their business practices to ensure full compliance.

Pricing Decisions for Approved Products

In the EU, 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 or so-called health technology assessments, in order to obtain reimbursement or pricing approval. For example, EU Member States have the option 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 EU 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 health care expenditures, especially in light of the severe fiscal and debt crises experienced by many countries in the EU. The downward pressure on health care 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, i.e., arbitrage between low-priced and high-priced EU 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 products, if approved in those countries.

Employees

As of December 31, 2018, we had 83 full-time employees, including 57 employees with advanced degrees. Of these full-time employees, 68 employees are engaged in research and development activities and 15 are engaged in general and administrative activities. None of our employees is represented by a labor union or covered by a collective bargaining agreement. We consider our relationship with our employees to be good.

Our Corporate Information

We were formed under the laws of the State of Delaware in February 2013 as a limited liability company under the name Arvinas, LLC. In July 2013, Arvinas, LLC converted into a Delaware corporation and changed its name to Arvinas, Inc. In December 2014, we completed a series of transactions pursuant to which Arvinas, Inc. became a direct, wholly owned subsidiary of Arvinas Holding Company, LLC, a Delaware limited liability company. Immediately prior to our initial public offering, we converted from a Delaware limited liability company to a Delaware corporation and changed our name to Arvinas, Inc. Our office is located at 5 Science Park, 395 Winchester Ave., New Haven, CT 06511 and our telephone number is (203) 535-1456. Our website address is www.arvinas.com.

Throughout this Annual Report on Form 10-K, the “Company,” “Arvinas,” “we,” “us,” and “our,” except where the context requires otherwise, refer to Arvinas, Inc. and its consolidated subsidiaries, or any one or more of them as the context may require, and “our board of directors” refers to the board of directors of Arvinas, Inc.

We use Arvinas, the Arvinas logo, and other marks as trademarks in the United States and other countries. This Annual Report on Form 10-K contains references to our trademarks and service marks and to those belonging to other entities. Solely for convenience, trademarks and trade names referred to in this Annual Report on Form 10-K, including logos, artwork and other visual displays, may appear without the ® or ™ symbols, but such references are not intended to indicate in any way that we will not assert, to the fullest extent under applicable law, our rights or the rights of the applicable licensor to these trademarks and trade names. We do not intend our use or display of other entities’ trade names, trademarks or service marks to imply a relationship with, or endorsement or sponsorship of us by, any other entity.

Available Information

Through our website, we make available 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 Sections 13(a) and 15(d) of the Exchange Act of 1934, as amended, or the Exchange Act. We make these reports available through our website as soon as reasonably practicable after we electronically file such reports with, or furnish such reports to, the Securities and Exchange Commission, or the SEC. We also make available, free of charge on our website, the reports filed with the SEC by our executive officers, directors and 10% stockholders pursuant to Section 16 under the Exchange Act as soon as reasonably practicable after copies of those filings are provided to us by those persons. In addition, we regularly use our website to post information regarding our business, product development programs and governance, and we encourage investors to use our website, particularly the information in the section entitled "Investors & Media," as a source of information about us.

The information on our website is not incorporated by reference into this Annual Report on Form 10-K and should not be considered to be a part of this Annual Report on Form 10-K. Our website address is included in this Annual Report on Form 10-K as an inactive technical reference only.

Item 1A. Risk Factors.

Investing in our common stock involves a high degree of risk. You should carefully consider the risks and uncertainties described below together with all of the other information contained in this Annual Report on Form 10-K, including our consolidated financial statements and the related notes appearing elsewhere in this Annual Report on Form 10-K, before deciding to invest in our common stock. If any of the following risks actually occur, our business, prospects, operating results and financial condition could suffer materially. In such event, the trading price of our common stock could decline and you might lose all or part of your investment.

Risks Related to Our Financial Position and Need For Additional Capital

We have incurred significant losses since our inception. We expect to incur losses over at least the next several years and may never achieve or maintain profitability.

Our net loss was $41.5 million for the year ended December 31, 2018 and $24.0 million for the year ended December 31, 2017. As of December 31, 2018, we had an accumulated deficit of $302.3 million. To date, we have not generated any revenue from product sales and have financed our operations primarily through sales of our equity interests, proceeds from our collaborations, grant funding and debt financing. We are still in the early stages of development of our product candidates and initiated our first clinical trial in March 2019. We expect to continue to incur significant expenses and increasing operating losses for at least the next several years. We anticipate that our expenses will increase substantially if and as we:

- conduct a Phase 1 clinical trial of our product candidate, ARV-110, in men with metastatic castration-resistant prostate cancer, or mCRPC;
- initiate a planned Phase 1 clinical trial of our product candidate, ARV-471, in women with locally advanced or metastatic ER positive / HER2 negative breast cancer;
- apply our PROTAC platform to advance additional product candidates into preclinical and clinical development;
- expand the capabilities of our PROTAC platform;
- seek marketing approvals for any product candidates that successfully complete clinical trials;
- ultimately establish a sales, marketing and distribution infrastructure and scale up external manufacturing capabilities to commercialize any products for which we may obtain marketing approval;
- expand, maintain and protect our intellectual property portfolio;
- hire additional clinical, regulatory and scientific personnel; and
- add operational, financial and management information systems and personnel to support our research, product development and future commercialization efforts and support our operations as a public company.

Our expenses could increase beyond our expectations if we are required by the U.S. Food and Drug Administration, or FDA, the European Medicines Agency, or EMA, or other regulatory authorities to perform trials in addition to those that we currently expect, or if there are any delays in establishing appropriate manufacturing arrangements for or in completing our clinical trials or the development of any 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 we will incur or when, if ever, we will be able to achieve profitability. Even if we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our failure to become and remain profitable would depress the value of our company and could impair our ability to raise capital, expand our business, maintain our research and development efforts, diversify our product offerings or even continue our operations. A decline in the value of our company could also cause you to lose all or part of your investment.

We have never generated revenue from product sales and may never be profitable.

We have only recently initiated clinical development of our first product candidate and expect that it will be many years, if ever, before we have a product candidate ready for commercialization. We may never succeed in these activities and, even if we do, may never generate revenues that are significant enough to achieve profitability. To become and remain profitable, we must succeed in developing, obtaining marketing approval for and commercializing products that generate significant revenue. This will require us to be successful in a range of challenging activities, including completing preclinical testing and clinical trials of our product candidates, discovering additional product candidates, establishing arrangements with third parties for the manufacture of clinical supplies of our product candidates, obtaining marketing approval for our product candidates and manufacturing, marketing and selling any products for which we may obtain marketing approval.

If one or more of the product candidates that we develop is approved for commercial sale, we anticipate incurring significant costs associated with commercializing any approved product candidate. Even if we are able to generate revenues from the sale of any approved products, we may not become profitable and may need to obtain additional funding to continue operations.

We will need substantial additional funding. If we are unable to raise capital when needed, we may be required to delay, limit, reduce or terminate our research or product development programs or future commercialization efforts.

We expect our expenses to increase substantially in connection with our ongoing activities, particularly as we conduct our Phase 1 clinical trial of ARV-110, prepare for and initiate our planned Phase 1 clinical trial of ARV-471, advance our neurodegenerative programs and continue research and development and initiate additional clinical trials of and potentially seek marketing approval for our lead programs and our other product candidates. In addition, if we obtain marketing approval for any of our product candidates, we expect to incur significant commercialization expenses related to product manufacturing, marketing, sales and distribution. We expect to incur additional costs associated with operating as a public company. Accordingly, we will need to obtain substantial additional funding in connection with our continuing operations. If we are unable to raise capital when needed or on attractive terms, we may be required to delay, limit, reduce or terminate our research, product development programs or any future commercialization efforts or grant rights to develop and market product candidates that we would otherwise prefer to develop and market ourselves.

We had cash, cash equivalents and marketable securities of approximately $187.8 million as of December 31, 2018 and $39.2 million as of December 31, 2017. We believe that our cash, cash equivalents and marketable securities as of December 31, 2018 will enable us to fund our operating expenses and capital expenditure requirements into the first half of 2021. We have based this estimate on assumptions that may prove to be wrong, and we could use our capital resources sooner than we currently expect. Our future capital requirements will depend on many factors, including:

- the progress, costs and results of our Phase 1 clinical trial for ARV-110 and our planned Phase 1 clinical trial for ARV-471 and any future clinical development of ARV-110 and ARV-471;
- the scope, progress, costs and results of preclinical and clinical development for our other product candidates and development programs;
- the number and development requirements of other product candidates that we pursue, including our neurodegenerative research programs;
- the success of our collaborations with Pfizer, Inc., or Pfizer, and Genentech, Inc. and F. Hoffman-LaRoche Ltd., collectively referred to as Genentech;

- the costs, timing and outcome of regulatory review of our product candidates;
- the costs and timing of future commercialization activities, including product manufacturing, marketing, sales and distribution, for any of our product candidates for which we receive marketing approval;
- the revenue, if any, received from commercial sales of our product candidates for which we receive marketing approval;
- the costs and timing of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property rights and defending any intellectual property-related claims; and
- our ability to establish collaboration arrangements with other biotechnology or pharmaceutical companies on favorable terms, if at all, for the development or commercialization of our product candidates.

Identifying potential product candidates and conducting preclinical testing and clinical trials is a time-consuming, expensive and uncertain process that takes years to complete, and we may never generate the necessary data or results required to obtain marketing approval and achieve product sales. In addition, our product candidates, if approved, may not achieve commercial success. Our commercial revenues, if any, will be derived from sales of products that we do not expect to be commercially available for many years, if at all. Accordingly, we will need to obtain substantial additional funds to achieve our business objectives. Adequate additional funds may not be available to us on acceptable terms, or at all. In addition, we may seek additional capital due to favorable market conditions or strategic considerations, even if we believe we have sufficient funds for our current or future operating plans.

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

Until such time, if ever, as we can generate substantial revenue from product sales, we expect to finance our cash needs through a combination of equity offerings, debt financings, collaborations, strategic alliances and marketing, distribution or licensing arrangements. Although we may receive potential future payments under our collaborations with Pfizer and Genentech, we do not currently have any committed external source of funds. 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.

We have in the past entered into financing arrangements with the State of Connecticut and related entities. These include $4.5 million in partially forgivable loans from the State of Connecticut and a loan agreement with Connecticut Innovations, Incorporated, or CII, the strategic venture capital arm and a component unit of the State of Connecticut, in an aggregate principal amount of $750,000. We also granted CII a warrant to purchase 110,116 of our series A preferred units, which it exercised in July 2018. Covenants in these financing arrangements impose certain limitations and obligations on us, including restrictions on our ability to incur additional debt, to enter into certain business combinations, and from moving our principal offices out of Connecticut. If we were to move our principal offices out of Connecticut or certain employment conditions are not met, we would be obligated to repay the full amount of our previously forgiven loans to the State of Connecticut, currently $2.5 million, and prepay a portion of our unforgiven loans to the State of Connecticut, currently $2.0 million, plus liquidated damages of 7.50%. Additionally, CII would be entitled to obligate us to purchase all of our outstanding securities owned by CII for a specified guaranteed return pursuant to a put agreement with CII.

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 product candidates or grant licenses on terms that may not be favorable to us.

Our limited operating history may make it difficult for you to evaluate the success of our business to date and to assess our future viability.

We commenced operations in 2013, and our operations to date have been limited to organizing and staffing our company, business planning, raising capital, conducting discovery and research activities, filing patent applications, identifying potential product candidates, undertaking preclinical studies and establishing arrangements with third parties for the manufacture of initial quantities of our product candidates. In March 2019, we initiated our first Phase 1 clinical trial for a product candidate, ARV-110. All of our other product candidates are still in preclinical development. We have not yet demonstrated our ability to successfully complete any clinical trials, obtain marketing approvals, manufacture a commercial scale product, or arrange for a third party to do so on our behalf, or conduct sales, marketing and distribution activities necessary for successful product commercialization. Consequently, any predictions you make about our future success or viability may not be as accurate as they could be if we had a longer operating history.

In addition, as a young business, we may encounter unforeseen expenses, difficulties, complications, delays and other known and unknown factors. We will need to transition at some point from a company with a research and development focus to a company capable of supporting commercial activities. We may not be successful in such a transition.

We expect our financial condition and operating results to continue to fluctuate significantly from quarter to quarter and year to year due to a variety of factors, many of which are beyond our control. Accordingly, you should not rely upon the results of any quarterly or annual periods as indications of future operating performance.

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

On December 22, 2017, President Trump signed into law new legislation, commonly referred to as the Tax Cuts and Jobs Act of 2017 (the "Act"), that significantly revised the Internal Revenue Code of 1986, as amended. The Act contains, among other things, 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 net interest expense to 30% of adjusted earnings (except for certain small businesses), limitation of the deduction for net operating losses to 80% of current year taxable income and elimination of net operating loss carrybacks, 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), one-time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, elimination of U.S. tax on foreign earnings (subject to certain important exceptions), immediate deductions for certain new investments instead of deductions for depreciation expense over time, and modifying or repealing many business deductions and credits. Notwithstanding the reduction in the corporate income tax rate, the overall impact of the Act is uncertain and our business and financial condition could be adversely affected. In addition, it is uncertain how various states will respond to the Act. The impact of this tax reform on holders of our common stock is also uncertain and could be adverse. We urge prospective investors in our common stock to consult with their legal and tax advisors with respect to this legislation and the potential tax consequences of investing in or holding our common stock.

We might not be able to utilize a significant portion of our net operating loss carryforwards and research and development tax credit carryforwards.

As of December 31, 2018, we had federal net operating loss carryforwards of $58.3 million, which will, if not used, expire at various dates through 2037, and federal research and development tax credit carryforwards of $2.7 million, which will, if not used, expire at various dates through 2038. To the extent they expire unused, these net operating loss and tax credit carryforwards will not be available to offset our future income tax liabilities. Federal net operating losses incurred in 2018 and in future years may be carried forward indefinitely, but the deductibility of such carryforwards is limited to 80% of our taxable income in the year in which carryforwards are used.

In addition, under Section 382 of the Internal Revenue Code of 1986, as amended, and corresponding provisions of state law, if a corporation undergoes an "ownership change," which is 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 income may be limited. We have not determined if we have experienced Section 382 ownership changes in the past and if a portion of our net operating loss and tax credit carryforwards are subject to an annual limitation under Section 382. In addition, we may experience ownership changes in the future as a result of subsequent changes in our stock ownership, some of which may be outside of our control. If we determine that an ownership change has occurred and our ability to use our historical net operating loss and tax credit carryforwards is materially limited, it would harm our future operating results by effectively increasing our future tax obligations.

Risks Related to the Discovery and Development of Our Product Candidates

Our approach to the discovery and development of product candidates based on our PROTAC technology platform is unproven, which makes it difficult to predict the time, cost of development and likelihood of successfully developing any products.

Our PROTAC technology platform is a relatively new technology. Our future success depends on the successful development of this novel therapeutic approach. No product candidates that use a chimeric small molecule approach to protein degradation, such as our PROTAC targeted protein degraders, have been tested in humans or approved in the United States or Europe, and the data underlying the feasibility of developing chimeric small molecule-based therapeutic products is both preliminary and limited. We have not yet succeeded and may not succeed in demonstrating the efficacy and safety of any of our product candidates in clinical trials or in obtaining marketing approval thereafter. We have not yet initiated a clinical trial of any product candidate and we have not yet assessed safety of any product candidate in humans. As such, there may be adverse effects from treatment with any of our current or future product candidates that we cannot predict at this time.

As a result of these factors, it is more difficult for us to predict the time and cost of product candidate development, and we cannot predict whether the application of our PROTAC platform, or any similar or competitive protein degradation platforms, will result in the development, and marketing approval of any products. Any development problems we experience in the future related to our PROTAC platform or any of our research programs may cause significant delays or unanticipated costs or may prevent the development of a commercially viable product. Any of these factors may prevent us from completing our preclinical studies or any clinical trials that we may initiate or commercializing any product candidates we may develop on a timely or profitable basis, if at all.

We are very early in our development efforts. We have only recently initiated our first clinical trial. If we are unable to commercialize our product candidates or experience significant delays in doing so, our business will be materially harmed.

We are very early in our development efforts. In March 2019, we initiated our first Phase 1 clinical trial for a product candidate, ARV-110. All of our other product candidates are still in preclinical development. Our ability to generate revenue from product sales, which we do not expect will occur for many years, if ever, will depend heavily on the successful development and eventual commercialization of one or more of our product candidates. The success of our product candidates will depend on several factors, including the following:

- successful completion of preclinical studies;
- successful initiation of clinical trials;
- successful patient enrollment in and completion of clinical trials;
- receipt and related terms of marketing approvals from applicable regulatory authorities;
- obtaining and maintaining patent and trade secret protection and regulatory exclusivity for our product candidates;
- making arrangements with third-party manufacturers, or establishing manufacturing capabilities, for both clinical and commercial supplies of our product candidates;
- establishing sales, marketing and distribution capabilities and launching commercial sales of our products, if and when approved, whether alone or in collaboration with others;
- acceptance of our products, if and when approved, by patients, the medical community and third-party payors;
- obtaining and maintaining third-party coverage and adequate reimbursement;
- maintaining a continued acceptable safety profile of the products following approval; and
- effectively competing with other therapies.

If we do not achieve one or more of these factors in a timely manner or at all, we could experience significant delays or an inability to successfully commercialize our product candidates, which would materially harm our business.

Drug development involves a lengthy and expensive process, with an uncertain outcome. We may incur unexpected costs or experience delays in completing, or ultimately be unable to complete, the development and commercialization of our product candidates.

In March 2019, we initiated our first Phase 1 clinical trial for a product candidate, ARV-110. All of other our product candidates are in preclinical development. The risk of failure for our product candidates is high. We are unable to predict when or if any of our product candidates will prove effective or safe in humans or will receive marketing approval. Before obtaining marketing approval from regulatory authorities for the sale of any product candidate, we must conduct extensive clinical trials to demonstrate the safety and efficacy of our product candidates in humans. Before we can commence clinical trials for a product candidate, we must complete extensive preclinical testing and studies that support our planned Investigational New Drug Applications, or INDs, in the United States or similar applications in other jurisdictions. We cannot be certain of the timely completion or outcome of our preclinical testing and studies and cannot predict if the FDA or similar regulatory authorities outside the United States will accept our proposed clinical programs or if the outcome of our preclinical testing and studies will ultimately support the further development of our programs.

Clinical testing is expensive, difficult to design and implement, can take many years to complete and is uncertain as to the outcome. A failure of one or more clinical trials can occur at any stage of testing. We may experience numerous unforeseen events during, or as a result of, clinical trials that could delay or prevent our ability to receive marketing approval or commercialize our product candidates, including:

- regulators or institutional review boards may not authorize us or our investigators to commence a clinical trial or conduct a clinical trial at a prospective trial site;
- we may experience delays in reaching, or fail to reach, agreement on acceptable clinical trial contracts or clinical trial protocols with prospective trial sites;
- clinical trials of our product candidates may produce negative or inconclusive results, and we may decide, or regulators may require us, to conduct additional clinical trials or abandon product development programs;
- the number of patients required for clinical trials of our product candidates may be larger than we anticipate, enrollment in these clinical trials may be slower than we anticipate or participants may drop out of these clinical trials at a higher rate than we anticipate;
- our third-party contractors may fail to comply with regulatory requirements or meet their contractual obligations to us in a timely manner, or at all;
- we may have to suspend or terminate clinical trials of our product candidates for various reasons, including a finding that the participants are being exposed to unacceptable health risks;
- regulators or institutional review boards may require that we or our investigators suspend or terminate clinical trials for various reasons, including noncompliance with regulatory requirements;
- our product candidates may have undesirable side effects or other unexpected characteristics, causing us or our investigators, regulators or institutional review boards to suspend or terminate the trials;
- the cost of clinical trials of our product candidates may be greater than we anticipate; and
- the supply or quality of our product candidates or other materials necessary to conduct clinical trials of our product candidates may be insufficient or inadequate.

If we are required to conduct additional clinical trials or other testing of our product candidates beyond those that we currently contemplate, if we are unable to successfully complete clinical trials of our product candidates or other testing, if the results of these trials or tests are not positive or are only modestly positive or if there are safety concerns, we may:

- be delayed in obtaining marketing approval for our product candidates;
- not obtain marketing approval at all;
- obtain approval for indications or patient populations that are not as broad as intended or desired;
- obtain approval with labeling that includes significant use or distribution restrictions or safety warnings;
- be subject to additional post-marketing testing requirements; or
- have the product removed from the market after obtaining marketing approval.

Our product development costs will also increase if we experience delays in preclinical studies or clinical trials or in obtaining marketing approvals. We do not know whether any of our preclinical studies or clinical trials will begin as planned, will need to be restructured or will be completed on schedule, or at all. Significant preclinical study or clinical trial delays also could shorten any periods during which we may have the exclusive right to commercialize our product candidates or allow our competitors to bring products to market before we do and impair our ability to successfully commercialize our product candidates and may harm our business and results of operations.

Further, cancer therapies are sometimes characterized as first-line, second-line, or third-line, and the FDA often approves new therapies initially only for third-line use. When cancer is detected early enough, first-line therapy, usually hormone therapy, surgery, radiation therapy or a combination of these, is sometimes adequate to cure the cancer or prolong life without a cure. Second- and third-line therapies are administered to patients when prior therapy is not effective. Our current and planned clinical trials for ARV-110 and ARV-471 will be with patients who have received one or more prior treatments. Subsequently, for those products that prove to be sufficiently beneficial, if any, we would expect to seek approval potentially as a first-line therapy, but any product candidates we develop, even if approved, may not be approved for first-line therapy, and, prior to any such approvals, we may have to conduct additional clinical trials.

If serious adverse events, undesirable side effects, or unexpected characteristics are identified during the development of any product candidates we may develop, we may need to abandon or limit our further clinical development of those product candidates.

In March 2019, we initiated our first Phase 1 clinical trial for a product candidate, ARV-110. We have not otherwise evaluated any product candidates in human clinical trials. Moreover, we are not aware of any clinical trials conducted by others involving chimeric small molecules, such as our PROTAC targeted protein degraders. It is impossible to predict when or if any product candidates we may develop will prove safe in humans. There can be no assurance that our PROTAC technology will not cause undesirable side effects.

A potential risk in any protein degradation product is that healthy proteins or proteins not targeted for degradation will be degraded or that the degradation of the targeted protein in itself could cause adverse events, undesirable side effects, or unexpected characteristics. It is possible that healthy proteins or proteins not targeted for degradation could be degraded using our PROTAC technology in any of our ongoing, planned or future clinical studies. There is also the potential risk of delayed adverse events following treatment using our PROTAC technology.

If any product candidates we develop are associated with serious adverse events, or undesirable side effects, or have characteristics that are unexpected, we may need to abandon their development or limit development to certain uses or subpopulations in which the adverse events, undesirable side effects or other characteristics are less prevalent, less severe, or more acceptable from a risk-benefit perspective, any of which would have a material adverse effect on our business, financial condition, results of operations, and prospects. Many product candidates that initially showed promise in early-stage testing for treating cancer or other diseases have later been found to cause side effects that prevented further clinical development of the product candidates or limited their competitiveness in the market.

The results of early-stage clinical trials and preclinical studies may not be predictive of future results. Initial success in clinical trials may not be indicative of results obtained when these trials are completed or in later stage trials.

The results of preclinical studies may not be predictive of the results of clinical trials, and the results of any early-stage clinical trials we commence may not be predictive of the results of the later-stage clinical trials. In addition, initial success in clinical trials may not be indicative of results obtained when such trials are completed. In particular, the small number of patients in our ongoing and planned early clinical trials may make the results of these trials less predictive of the outcome of later clinical trials. For example, even if successful, the results of the dose-escalation portion of our Phase 1 clinical trial of ARV-110 and our planned Phase 1 clinical trial of ARV-471 may not be predictive of the results of further clinical trials of these product candidates or any of our other product candidates. Moreover, preclinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that have believed their product candidates performed satisfactorily in preclinical studies and clinical trials have nonetheless failed to obtain marketing approval of their products. Our current or future clinical trials may not ultimately be successful or support further clinical development of any of our product candidates. There is a high failure rate for product candidates proceeding through clinical trials. A number of companies in the pharmaceutical and biotechnology industries have suffered significant setbacks in clinical development even after achieving encouraging results in earlier studies. Any such setbacks in our clinical development could materially harm our business and results of operations.

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

From time to time, we may publish interim top-line or preliminary data from our clinical trials. Interim data from clinical trials that we may complete are subject to the risk that one or more of the clinical outcomes may materially change as patient enrollment continues and more patient data become available. Preliminary or top-line data also remain subject to audit and verification procedures that may result in the final data being materially different from the preliminary data we previously published. As a result, interim and preliminary data should be viewed with caution until the final data are available. Adverse differences between preliminary or interim data and final data could significantly harm our reputation and business prospects.

If we experience delays or difficulties in the enrollment of patients in clinical trials, our receipt of necessary marketing approvals could be delayed or prevented.

We may not be able to initiate or continue clinical trials for our product candidates if we are unable to locate and enroll a sufficient number of eligible patients to participate in these trials as required by the FDA or similar regulatory authorities outside of the United States. In particular, we initiated a Phase 1 clinical trial of ARV-110 for men with mCRPC and we are preparing to advance ARV-471 into a Phase 1 clinical trial for women with locally advanced or metastatic ER positive / HER2 negative breast cancer. We cannot predict how difficult it will be to enroll patients for trials in these indications. Therefore, our ability to identify and enroll eligible patients for ARV-110 and ARV-471 clinical trials may be limited or may result in slower enrollment than we anticipate. In addition, some of our competitors have ongoing clinical trials for product candidates that treat the same indications as our product candidates, and patients who would otherwise be eligible for our clinical trials may instead enroll in clinical trials of our competitors' product candidates. Patient enrollment is affected by other factors including:

- the severity of the disease under investigation;
- the eligibility criteria for the trial in question;
- the perceived risks and benefits of the product candidates under study;
- the efforts to facilitate timely enrollment in clinical trials;
- the patient referral practices of physicians;
- the burden on patients due to inconvenient procedures;
- the ability to monitor patients adequately during and after treatment; and
- the proximity and availability of clinical trial sites for prospective patients.

Our inability to enroll a sufficient number of patients for our clinical trials would result in significant delays and could require us to abandon one or more clinical trials altogether. Enrollment delays in our clinical trials may result in increased development costs for our product candidates, which would cause the value of our company to decline and limit our ability to obtain additional financing.

We may expend our limited resources to pursue a particular product candidate or indication and fail to capitalize on product candidates or indications that may be more profitable or for which there is a greater likelihood of success.

Because we have limited financial and managerial resources, we focus on research programs and product candidates that we identify for specific indications. As a result, we may forego or delay pursuit of opportunities with other product candidates or for other indications that later prove to have greater commercial potential. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities. Our spending on current and future research and development programs and product candidates for specific indications may not yield any commercially viable products. If we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through collaboration, licensing or other royalty arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate.

We may develop ARV-471 in combination with other drugs. If the FDA or similar regulatory authorities outside of the United States do not approve these other drugs, revoke their approval of such drugs, or if safety, efficacy, manufacturing or supply issues arise with the drugs we choose to evaluate in combination with ARV-471, we may be unable to obtain approval of ARV-471 or market ARV-471.

We intend to conduct a Phase 1b clinical trial with ARV-471 for the treatment of women with locally advanced or metastatic ER positive / HER2 negative breast cancer for use in combination with a CDK 4/6 inhibitor, such as palbociclib, once a recommended dose is identified from the dose-escalation portion of the ARV-471 Phase 1 clinical trial. We did not develop or obtain marketing approval for, nor do we manufacture or sell, any of the currently approved drugs that we may study in combination with ARV-471. If the FDA or similar regulatory authorities outside of the United States revoke their approval of the drug or drugs in combination with which we determine to develop ARV-471, we will not be able to market ARV-471 in combination with such revoked drugs.

If safety or efficacy issues arise with any of these drugs, 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. If the drugs we use are replaced as the standard of care for the indications we choose for ARV-471, 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 drugs with which we determine to combine with ARV-471, we may not be able to complete clinical development of ARV-471 on our current timeline or at all.

Even if ARV-471 were to receive marketing approval or be commercialized for use in combination with other existing drugs, 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 the drug used in combination with ARV-471 or that safety, efficacy, manufacturing or supply issues could arise with these existing drugs. Combination therapies are commonly used for the treatment of cancer, and we would be subject to similar risks if we develop any of our other product candidates for use in combination with other drugs or for indications other than cancer. This could result in our own products being removed from the market or being less successful commercially.

We may not be successful in our efforts to identify or discover additional potential product candidates.

A key element of our strategy is to apply our PROTAC platform to address a broad array of targets and new therapeutic areas. The therapeutic discovery activities that we are conducting may not be successful in identifying product candidates that are useful in treating cancer or other diseases. Our research programs may initially show promise in identifying potential product candidates, yet fail to yield product candidates for clinical development for a number of reasons, including:

- potential product candidates may, on further study, be shown to have harmful side effects or other characteristics that indicate that they are unlikely to be drugs that will receive marketing approval or achieve market acceptance; or
- potential product candidates may not be effective in treating their targeted diseases.

Research programs to identify new product candidates require substantial technical, financial and human resources. We may choose to focus our efforts and resources on a potential product candidate that ultimately proves to be unsuccessful. If we are unable to identify suitable product candidates for preclinical and clinical development, we will not be able to obtain revenues from sale of products in future periods, which likely would result in significant harm to our financial position and adversely impact our stock price.

We face substantial competition, which may result in others discovering, developing or commercializing products before or more successfully than we do.

The biotechnology and pharmaceutical industries are characterized by rapidly advancing technologies, intense competition and a strong emphasis on proprietary products. We face and will continue to face competition from third parties that use protein degradation, antibody therapy, inhibitory nucleic acid, gene editing or gene therapy development platforms and from companies focused on more traditional therapeutic modalities, such as small molecule inhibitors. The competition is likely to come from multiple sources, including major pharmaceutical, specialty pharmaceutical and biotechnology companies, academic institutions, government agencies and public and private research institutions.

We are aware of several biotechnology companies focused on developing chimeric small molecules for protein degradation including C4 Therapeutics, Inc., Cullgen Inc., Kymera Therapeutics, Inc. and Nurix Therapeutics, Inc., all of which are currently in preclinical development. Further, several large pharmaceutical companies have disclosed preclinical investments in this field, including Amgen Inc., AstraZeneca plc, Celgene, GlaxoSmithKline plc, Genentech and Novartis International AG.

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, obtaining regulatory approvals and marketing approved products than we do. These competitors also compete with us in recruiting and retaining qualified scientific and management personnel and establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs. Mergers and acquisitions in the pharmaceutical and biotechnology industries may result in even more resources being concentrated among a smaller number of our competitors. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies. These competitors also compete with us in recruiting and retaining qualified scientific and management personnel and establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs. Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize products that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than any products that we may develop. Our competitors also may obtain FDA or other regulatory approval for their products more rapidly than we may obtain approval for ours, which could result in our competitors establishing a strong market position before we are able to enter the market. In addition, our ability to compete may be affected in many cases by insurers or other third-party payors seeking to encourage the use of generic products. There are generic products currently on the market for certain of the indications that we are pursuing, and additional products are expected to become available on a generic basis over the coming years. If our product candidates are approved, we expect that they will be priced at a significant premium over competitive generic products.

Risks Related to Dependence on Third Parties

We expect to depend on collaborations with third parties for the research, development, and commercialization of certain of the product candidates we may develop. If any such collaborations are not successful, we may not be able to capitalize on the market potential of those product candidates.

We anticipate seeking third-party collaborators for the research, development, and commercialization of some of our PROTAC programs. For example, in September 2015 we entered into a collaboration with Genentech, which we amended and restated in November 2017, and in December 2017 we entered into a collaboration with Pfizer. Our likely collaborators for any other collaboration arrangements include large and mid-size pharmaceutical companies and biotechnology companies. Any such arrangements with third parties will likely limit our control over the amount and timing of resources that our collaborators dedicate to the development or commercialization of any product candidates we may seek to develop with them. Our ability to generate revenues from these arrangements will depend on our collaborators' abilities to successfully perform the functions assigned to them in these arrangements. We cannot predict the success of any collaboration that we enter into.

Collaborations involving our research programs or any product candidates we may develop, including our collaborations with Genentech and Pfizer, pose the following risks to us:

- Collaborators have significant discretion in determining the efforts and resources that they will apply to these collaborations. For example, our collaboration with Genentech is managed by a joint research committee and joint project team, which is composed of representatives from us and Genentech, with Genentech having final decision-making authority. Similarly, our collaboration with Pfizer is managed by a joint research committee composed of an equal number of representatives from us and Pfizer, with Pfizer having final decision-making authority.
- Collaborators may not pursue development and commercialization of any product candidates we may develop or may elect not to continue or renew development or commercialization programs based on clinical trial results, changes in the collaborator's strategic focus or available funding or external factors such as an acquisition or business combination that diverts resources or creates competing priorities.

- Genentech and Pfizer have broad rights to select any target for protein degradation development, so long as not excluded by us under the terms of each collaboration and may select targets we are considering but have not taken sufficient action to exclude under the collaboration.
- Collaborators may delay clinical trials, provide insufficient funding for a clinical trial program, stop a clinical trial or 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 products or product candidates if the collaborators believe that competitive products are more likely to be successfully developed or can be commercialized under terms that are more economically attractive than ours.
- Collaborators with marketing and distribution rights to one or more products may not commit sufficient resources to the marketing and distribution of such product or products.
- Collaborators may not properly obtain, maintain, enforce, or defend our intellectual property or proprietary rights or may use our proprietary information in such a way that could jeopardize or invalidate our proprietary information or expose us to potential litigation. For example, Pfizer and Genentech have the first right to enforce or defend certain intellectual property rights under the applicable collaboration arrangement with respect to particular licensed programs, and although we may have the right to assume the enforcement and defense of such intellectual property rights if the collaborator does not, our ability to do so may be compromised by their actions.
- Disputes may arise between the collaborators and us that result in the delay or termination of the research, development, or commercialization of our products or product candidates or that result in costly litigation or arbitration that diverts management attention and resources.
- We may lose certain valuable rights under circumstances identified in our collaborations, including if we undergo a change of control.
- 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. For example, each of Genentech and Pfizer can terminate its agreement with us in its entirety or with respect to a specific target for convenience upon 60 days' notice or in connection with a material breach of the agreement by us that remains uncured for a specified period of time. In 2015, we entered into a collaboration agreement with Merck Sharp & Dohme Corp., or Merck, that expired in April 2018 with Merck not electing to continue research in any targets.
- Collaboration agreements may not lead to development or commercialization of product candidates in the most efficient manner or at all. If a present or future collaborator of ours were to be involved in a business combination, the continued pursuit and emphasis on our product development or commercialization program under such collaboration could be delayed, diminished, or terminated.

If our collaborations do not result in the successful development and commercialization of products, or if one of our collaborators terminates its agreement with us, we may not receive any future research funding or milestone or royalty payments under the collaboration. If we do not receive the funding we expect under these agreements, our development of product candidates could be delayed, and we may need additional resources to develop product candidates. In addition, if one of our collaborators terminates its agreement with us, we may find it more difficult to find a suitable replacement collaborator or attract new collaborators, and our development programs may be delayed or the perception of us in the business and financial communities could be adversely affected. All of the risks relating to product development, marketing approval, and commercialization described in this Annual Report on Form 10-K apply to the activities of our collaborators.

We may in the future decide to collaborate with pharmaceutical and biotechnology companies for the development and potential commercialization of any product candidates we may develop. These relationships, or those like them, 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. In addition, we could face significant competition in seeking appropriate collaborators, and the negotiation process is time-consuming and complex. Our ability to reach a definitive collaboration agreement will depend, among other things, upon our assessment of the collaborator's resources and expertise, the terms and conditions of the proposed collaboration, and the proposed collaborator's evaluation of several factors. If we license rights to any product candidates we or our collaborators may develop, 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.

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

To realize the full potential of our PROTAC platform and accelerate the development of additional PROTAC programs, we plan to continue to selectively pursue collaborations with leading biopharmaceutical companies with particular experience, including development and commercial expertise and capabilities. We face significant competition in attracting appropriate collaborators to advance the development of any product candidates for which we may seek a collaboration. Whether we reach a definitive agreement for a collaboration will depend, among other things, upon our assessment of the collaborator's resources and expertise, the terms and conditions of the proposed collaboration and the proposed collaborator's evaluation of a number of factors. Those factors may include the design or results of clinical trials, the likelihood of approval by the FDA or other regulatory authorities, the potential market for the subject product candidate, the costs and complexities of manufacturing and delivering such product candidate to patients, the potential of competing products, the existence of uncertainty with respect to our ownership of technology, which can exist if there is a challenge to such ownership without regard to the merits of the challenge, the terms of any existing collaboration agreements, and industry and market conditions generally. The collaborator may also have the opportunity to collaborate on other product candidates or technologies for similar indications and will have to evaluate whether such a collaboration could be more attractive than one with us.

Collaborations are complex and time-consuming to negotiate, document and execute. In addition, consolidation among large pharmaceutical companies has reduced the number of potential future collaborators. Any collaboration we enter into may limit our ability to enter into future agreements on particular terms or covering similar target indications with other potential collaborators.

We may not be able to negotiate collaborations on a timely basis, on acceptable terms or at all. If we are unable to do so, we may have to curtail the development of the product candidate for which we are seeking to collaborate, reduce or delay its development program or one or more of our other development programs, delay its potential commercialization or reduce the scope of any sales or marketing activities, or increase our expenditures and undertake development or commercialization activities at our own expense. If we elect to fund development or commercialization activities on our own, we may need to obtain additional capital, which may not be available to us on acceptable terms or at all. If we do not have sufficient funds, we may not be able to further develop our product candidates or bring them to market and generate revenue from product sales, which could have an adverse effect on our business, prospects, financial condition and results of operations.

We rely and expect to continue to rely on agreements with Yale University to supplement our internal research and development program. If Yale decides to discontinue or devote less resources to such research, our research efforts could be diminished.

Our set of arrangements with Yale University, or Yale, provide us with access to certain of Yale's intellectual property and to Professor Crews' laboratory in a manner that we believe closely aligns our scientific interests with those of Yale. We are a party to both a license agreement and a sponsored research agreement with Yale. While Yale has contractual obligations to us, it is an independent entity and is not under our control or the control of our officers or directors. The license agreement is structured to provide Yale with license maintenance fees, development and regulatory milestone payments, royalties on net sales of products, and a portion of sublicense income that we receive. Upon the scheduled expiration of the Yale research agreement in April 2021, the research agreement may not be renewed, or any renewal could be on terms less favorable to us than those contained in the existing agreement. Furthermore, either we or Yale may terminate the research agreement for convenience following a specified notice period. If Yale decides to not renew or to terminate the Yale research agreement or decides to devote fewer resources to such activities, our research efforts would be diminished, while our royalty obligations to Yale would continue unmodified, which could have a material adverse effect on our business and financial condition.

Our license agreement with Yale also provides that so long as Professor Crews serves as a member of our board of directors or scientific advisory board or has a similar advisory arrangement, has a consulting arrangement with us, or his laboratory is performing sponsored research for us, and so long as he is an employee or faculty member (including emeritus faculty member) at Yale, any future invention by Professor Crews' laboratory in the license agreement's field is included in the licensed intellectual property. If Professor Crews were to leave Yale or no longer be meaningfully involved with us, we would no longer have access to future inventions in the license agreement's field from Yale.

Additionally, the license granted under the license agreement terminates after a specified period following a qualifying change of control, unless we elect or our successor or assignee elects to continue the agreement. If the license is terminated after such a change of control, royalty payments would continue to be paid on certain licensed products.

We expect to rely on third parties to conduct our clinical trials, and those third parties may not perform satisfactorily, including failing to meet deadlines for the completion of such trials.

We will rely on third-party clinical research organizations, or CROs, to conduct our Phase 1 clinical trial program for ARV-110, our planned Phase 1 clinical trial program for ARV-471 and any other clinical trials and currently do not plan to independently conduct any clinical trials of ARV-110 and ARV-471 or of our other product candidates. Agreements with these third parties might terminate for a variety of reasons, including a failure to perform by the third parties. If we need to enter into alternative arrangements, that would delay our product development activities.

Our reliance on these third parties for research and development activities will reduce our control over these activities but will not relieve us of our responsibilities. For example, we will remain responsible for ensuring that each of our clinical trials is conducted in accordance with the general investigational plan and protocols in the applicable IND. Moreover, the FDA requires compliance with standards, commonly referred to as good clinical practices, or GCPs, for conducting, recording and reporting the results of clinical trials to assure that data and reported results are credible and accurate and that the rights, integrity and confidentiality of trial participants are protected.

Furthermore, these third parties may have relationships with other entities, some of which may be our competitors. If these third parties do not successfully carry out their contractual duties, meet expected deadlines or conduct our clinical trials in accordance with regulatory requirements or our stated protocols, we will not be able to obtain, or may be delayed in obtaining, marketing approvals for our product candidates and will not be able to, or may be delayed in our efforts to, successfully commercialize our product candidates.

We rely on third-party contract manufacturing organizations for the manufacture of both drug substance and finished drug product for our product candidates for preclinical testing and clinical trials and expect to continue to do so for commercialization. This reliance on third parties may increase the risk that we will not have sufficient quantities of our product candidates or products or such quantities at an acceptable cost or quality, which could delay, prevent or impair our development or commercialization efforts.

We do not own or operate, and currently have no plans to establish, any manufacturing facilities. We rely on and expect to continue to rely on third-party contract manufacturing organizations, or CMOs, for both drug substance and finished drug product. This reliance on third parties may increase the risk that we will not have sufficient quantities of our product candidates or products or such quantities at an acceptable cost or quality, which could delay, prevent or impair our development or commercialization efforts.

We may be unable to establish agreements with third-party manufacturers or to do so on acceptable terms. Even if we are able to establish agreements with third-party manufacturers, reliance on third-party manufacturers entails additional risks, including:

- reliance on the third party for regulatory, compliance and quality assurance;
- the possible breach of the manufacturing agreement by the third party;
- the possible misappropriation of our proprietary information, including our trade secrets and know-how; and
- the possible termination or nonrenewal of the agreement by the third party at a time that is costly or inconvenient for us.

We have only limited technology transfer agreements in place with respect to our product candidates, and these arrangements do not extend to commercial supply. We acquire many key materials on a purchase order basis. As a result, we do not have long term committed arrangements with respect to our product candidates and other materials. If we receive marketing approval for any of our product candidates, we will need to establish an agreement for commercial manufacture with a third party.

Third-party manufacturers may not be able to comply with current good manufacturing practices, or cGMP, regulations or similar regulatory requirements outside of the United States. Our failure, or the failure of our third-party manufacturers, to comply with applicable regulations could result in sanctions being imposed on us, including clinical holds, fines, injunctions, civil penalties, delays, suspension or withdrawal of approvals, license revocation, seizures or recalls of product candidates or products, operating restrictions and criminal prosecutions, any of which could significantly and adversely affect supplies of our products.

Our product candidates and any products that we may develop may compete with other product candidates and products for access to manufacturing facilities. As a result, we may not obtain access to these facilities on a priority basis or at all. There are a limited number of manufacturers that operate under cGMP regulations and that might be capable of manufacturing for us.

Any performance failure on the part of our existing or future manufacturers could delay clinical development or marketing approval. We do not currently have arrangements in place for redundant supply or a second source for bulk drug substance. If our current contract manufacturers cannot perform as agreed, we may be required to replace such manufacturers. Although we believe that there are several potential alternative manufacturers who could manufacture our product candidates, we may incur added costs and delays in identifying and qualifying any such replacement manufacturer or be able to reach agreement with any alternative manufacturer.

Our current and anticipated future dependence upon others for the manufacture of our product candidates or products may adversely affect our future profit margins and our ability to commercialize any products that receive marketing approval on a timely and competitive basis.

Risks Related to the Commercialization of Our Product Candidates

Even if any of our product candidates receives marketing approval, it may fail to achieve the degree of market acceptance by physicians, patients, third-party payors and others in the medical community necessary for commercial success.

If any of our product candidates receives marketing approval, it may nonetheless fail to gain sufficient market acceptance by physicians, patients, third-party payors and others in the medical community. For example, current cancer treatments, such as chemotherapy and radiation therapy, are well established in the medical community, and doctors may continue to rely on these treatments. If our product candidates do not achieve an adequate level of acceptance, we may not generate significant revenue from product sales and we may not become profitable. The degree of market acceptance of our product candidates, if approved for commercial sale, will depend on a number of factors, including:

- the efficacy and potential advantages compared to alternative treatments;
- the prevalence and severity of any side effects, in particular compared to alternative treatments;
- our ability to offer our products for sale at competitive prices;
- the convenience and ease of administration compared to alternative treatments;
- the willingness of the target patient population to try new therapies and of physicians to prescribe these therapies;
- the strength of marketing, sales and distribution support;
- the availability of third-party coverage and adequate reimbursement;
- the timing of any marketing approval in relation to other product approvals;
- support from patient advocacy groups; and
- any restrictions on the use of our products together with other medications.

If we are unable to establish sales and marketing capabilities, we may not be successful in commercializing our product candidates if and when they are approved.

We do not have a sales or marketing infrastructure and have no experience in the sale, marketing or distribution of biopharmaceutical products. To achieve commercial success for any product for which we obtain marketing approval, we will need to establish sales, marketing and distribution capabilities, either ourselves or through collaboration or other arrangements with third parties.

We currently expect that we would build our own focused, specialized sales and marketing organization to support the commercialization in the United States of product candidates for which we receive marketing approval and that can be commercialized with such capabilities. There are risks involved with establishing our own sales and marketing capabilities. For example, recruiting and training a sales force is expensive and time-consuming and could delay any product launch. If the commercial launch of a product candidate for which we recruit a sales force and establish marketing capabilities is delayed or does not occur for any reason, we would have prematurely or unnecessarily incurred these commercialization expenses. These efforts may be costly, and our investment would be lost if we cannot retain or reposition our sales and marketing personnel.

Factors that may inhibit our efforts to commercialize our products on our own include:

- our inability to recruit, train and retain adequate numbers of effective sales and marketing personnel;
- the inability of sales personnel to obtain access to physicians or persuade adequate numbers of physicians to prescribe any future products;
- the lack of complementary products to be offered by sales personnel, which may put us at a competitive disadvantage relative to companies with more extensive product lines; and
- unforeseen costs and expenses associated with creating an independent sales and marketing organization.

If we are unable to establish our own sales and marketing capabilities and enter into arrangements with third parties to perform these services, our revenue from product sales and our profitability, if any, are likely to be lower than if we were to market and sell any products that we develop ourselves. In addition, we may not be successful in entering into arrangements with third parties to market and sell our product candidates or may be unable to do so on terms that are acceptable to us. We likely will have little control over such third parties, and any of these third parties may fail to devote the necessary resources and attention to sell and market our products effectively. If we do not establish sales and marketing capabilities successfully, either on our own or in collaboration with third parties, we will not be successful in commercializing our product candidates.

Even if we are able to commercialize any product candidates, the products may become subject to unfavorable pricing regulations, third-party reimbursement practices or healthcare reform initiatives, which would harm our business.

The regulations that govern marketing approvals, pricing, coverage and reimbursement for new drug products vary widely from country to country. Current and future legislation may significantly change the approval requirements in ways that could involve additional costs and cause delays in obtaining approvals. Some countries require approval of the sale price of a drug before it can be marketed. In many countries, the pricing review period begins after marketing or product licensing approval is granted. To obtain reimbursement or pricing approval in some countries, we may be required to conduct a clinical trial that compares the cost-effectiveness of our product candidate to other available therapies. In some foreign markets, prescription pharmaceutical pricing remains subject to continuing governmental control even after initial approval is granted. As a result, we might obtain marketing approval for a product candidate in a particular country, but then be subject to price regulations that delay our commercial launch of the product, possibly for lengthy time periods, and negatively impact the revenues, if any, we are able to generate from the sale of the product in that country. Adverse pricing limitations may hinder our ability to recoup our investment in one or more product candidates, even if our product candidates obtain marketing approval.

Our ability to commercialize any product candidates successfully also will depend in part on the extent to which coverage and adequate reimbursement for these products and related treatments will be available from government healthcare programs, private health insurers and other organizations. Government authorities and third-party payors, such as private health insurers and health maintenance organizations, decide which medications they will pay for and establish reimbursement levels. A primary trend in the U.S. healthcare industry and elsewhere is cost containment. Government authorities and third-party payors have attempted to control costs by limiting coverage and the amount of reimbursement for particular medications. Increasingly, government authorities and third-party payors are requiring that drug companies provide them with predetermined discounts from list prices and are challenging the prices charged for medical products. Coverage and reimbursement may not be available for any product that we commercialize and, even if these are available, the level of reimbursement may not be satisfactory. Reimbursement may affect the demand for, or the price of, any product candidate for which we obtain marketing approval. Obtaining and maintaining adequate reimbursement for our products may be difficult. We may be required to conduct expensive pharmacoeconomic studies to justify coverage and reimbursement or the level of reimbursement relative to other therapies. If coverage and adequate reimbursement are not available or reimbursement is available only to limited levels, we may not be able to successfully commercialize any product candidate for which we obtain marketing approval.

There may be significant delays in obtaining coverage and reimbursement for newly approved drugs, and coverage may be more limited than the purposes for which the drug is approved by the FDA or similar regulatory authorities outside of the United States. Moreover, eligibility for coverage and reimbursement does not imply that a drug will be paid for in all cases or at a rate that covers our costs, including research, development, intellectual property, manufacture, sale and distribution expenses. Interim reimbursement levels for new drugs, if applicable, may also not be sufficient to cover our costs and may not be made permanent. Reimbursement rates may vary according to the use of the drug and the clinical setting in which it is used, may be based on reimbursement levels already set for lower cost drugs and may be

incorporated into existing payments for other services. Net prices for drugs may be reduced by mandatory discounts or rebates required by government healthcare programs or private payors and by any future relaxation of laws that presently restrict imports of drugs from countries where they may be sold at lower prices than in the United States. Third-party payors often rely upon Medicare coverage policy and payment limitations in setting their own reimbursement policies. Our inability to promptly obtain coverage and adequate reimbursement rates from both government-funded and private payors for any approved products that we develop could have a material adverse effect on our operating results, our ability to raise capital needed to commercialize products and our overall financial condition.

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

We face an inherent risk of product liability exposure related to the testing of our product candidates in human clinical trials and will face an even greater risk if we commercially sell any products that we may develop. If we cannot successfully defend ourselves against claims that our product candidates or products caused injuries, we will incur substantial liabilities. Regardless of merit or eventual outcome, liability claims may result in:

- decreased demand for any product candidates or products that we may develop;
- termination of clinical trials;
- withdrawal of marketing approval, recall, restriction on the approval or a "black box" warning or contraindication for an approved drug;
- withdrawal of clinical trial participants;
- significant costs to defend the related litigation;
- substantial monetary awards to trial participants or patients;
- loss of revenue;
- injury to our reputation and significant negative media attention;
- reduced resources of our management to pursue our business strategy; and
- the inability to commercialize any products that we may develop.

We currently hold $10.0 million in product liability insurance coverage in the aggregate, with a per incident limit of $10.0 million, which may not be adequate to cover all liabilities that we may incur. We will need to increase product liability insurance coverage as we expand our clinical trials and if we commence commercialization of our product candidates. Insurance coverage is increasingly expensive. We may not be able to maintain insurance coverage at a reasonable cost or in an amount adequate to satisfy any liability that may arise.

Risks Related to Our Intellectual Property

If we are unable to obtain and maintain patent protection for our technology and products or if the scope of the patent protection obtained is not sufficiently broad, our competitors could develop and commercialize technology and products similar or identical to ours, and our ability to successfully commercialize our technology and products may be impaired, and we may not be able to compete effectively in our market.

Our commercial success depends in part on our ability to obtain and maintain patent and other proprietary protection in the United States and other countries with respect to our proprietary technology and products. We seek to protect our proprietary position by filing patent applications in the United States and abroad related to our novel technologies and product candidates. 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. Moreover, the patent applications we own, co-own or license may fail to result in issued patents in the United States or in other foreign countries.

The patent prosecution process is expensive and time-consuming, and we may not be able to file and prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner. It is also possible that we will fail to identify patentable aspects of our research and development output before it is too late to obtain patent protection. Moreover, in some circumstances, we do not have the right to control the preparation, filing and prosecution of patent applications, or to maintain the patents, covering technology that we license from third parties. Therefore, these patents and applications may not be prosecuted and enforced in a manner consistent with the best interests of our business.

The patent position of biotechnology and pharmaceutical companies generally is highly uncertain, involves complex legal and factual questions and has in recent years been the subject of much litigation. In addition, the laws of foreign countries may not protect our rights to the same extent as the laws of the United States. For example, European patent law restricts the patentability of methods of treatment of the human body more than United States law does. Publications of discoveries in the scientific literature often lag behind the actual discoveries, and patent applications in the United States and other jurisdictions are typically not published until 18 months after filing, or in some cases not at all. Therefore, we cannot know with certainty whether we were the first to make the inventions claimed in our owned, co-owned or licensed patents or pending patent applications, or that we were the first inventors to file for patent protection of such inventions. As a result, the issuance, scope, validity, enforceability and commercial value of our patent rights are highly uncertain. Our pending and future patent applications may not result in patents being issued which protect our technology or products, in whole or in part, or which effectively prevent others from commercializing competitive technologies and products. Changes in either the patent laws or interpretation of the patent laws in the United States and other countries may diminish the value of our patents or narrow the scope of our patent protection.

Moreover, we may be subject to a third-party preissuance submission of prior art to the USPTO or in addition to interference proceedings, may become involved in opposition, derivation, reexamination, ***inter partes*** review, post-grant review or other post-grant proceedings challenging our or our licensors' patent rights or the patent rights of others. An adverse determination in any such submission, proceeding or litigation could reduce the scope of, or invalidate, our patent rights, allow third parties to commercialize our technology or products and compete directly with us, without payment to us, or result in our inability to manufacture or commercialize products without infringing third-party patent rights. In addition, if the breadth or strength of protection provided by our patents and patent applications is threatened, it could dissuade companies from collaborating with us to license, develop or commercialize current or future product candidates.

Our owned, co-owned and licensed patent estate consists principally of patent applications, many of which are at an early stage of prosecution. Even if our owned, co-owned and licensed patent applications issue as patents, they may not issue in a form that will provide us with any meaningful protection, prevent competitors from competing with us or otherwise provide us with any competitive advantage. Our competitors may be able to circumvent our owned, co-owned or licensed patents by developing similar or alternative technologies or products in a non-infringing manner.

The issuance of a patent is not conclusive as to its inventorship, scope, validity or enforceability, and our owned, co-owned and licensed patents may be challenged in the courts or patent offices in the United States and abroad. Such challenges may result in loss of exclusivity or freedom to operate or in patent claims being narrowed, invalidated or held unenforceable, in whole or in part, which could limit our ability to stop others from using or commercializing similar or identical technology and products, or limit the duration of the patent protection of our technology and products. Given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. As a result, our owned, co-owned and licensed patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours.

Changes in patent laws or patent jurisprudence could diminish the value of our patents in general, thereby impairing our ability to protect our product candidates.

Patent reform legislation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents. On September 16, 2011, the Leahy-Smith America Invents Act, or the Leahy-Smith Act, was signed into law. The Leahy-Smith Act includes a number of significant changes to United States patent law. These changes include provisions that affect the way patent applications are prosecuted and may also affect patent litigation. The USPTO developed new regulations and procedures to govern administration of the Leahy-Smith Act, and many of the substantive changes to patent law associated with the Leahy-Smith Act, and in particular, the first-inventor-to-file provisions, became effective on March 16, 2013. Accordingly, it is not clear what, if any, impact the Leahy-Smith Act will have on the operation of our business. However, the Leahy-Smith Act and its implementation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents, all of which could have a material adverse effect on our business and financial condition. Furthermore, for 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.

Additionally, the U.S. Supreme Court has ruled on several patent cases in recent years limiting where a patentee may file a patent infringement suit, narrowing the scope of patent protection available in certain circumstances or weakening the rights of patent owners in certain situations, and there are other open questions under patent law that courts have yet to decisively address. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents, once obtained.

Depending on decisions by Congress, the federal courts and the USPTO, the laws and regulations governing patents could change in unpredictable ways and could weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future. In addition, the European patent system is relatively stringent in the type of amendments that are allowed during prosecution, but, the complexity and uncertainty of European patent laws has also increased in recent years. Complying with these laws and regulations could limit our ability to obtain new patents in the future that may be important for our business.

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

Competitors may infringe our issued patents, the patents of our licensors, or other intellectual property. To counter infringement or unauthorized use, we may be required to file infringement claims, which can be expensive, time-consuming and unpredictable. Any claims we assert against perceived infringers could provoke these parties to assert counterclaims against us alleging that we infringe their patents. In addition, in a patent infringement proceeding, a court may decide that a patent of ours or our licensors is invalid or unenforceable, in whole or in part, construe the patent's claims narrowly or 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 proceeding could put one or more of our patents at risk of being invalidated, held unenforceable or interpreted narrowly. Even if we successfully assert our patents, a court may not award remedies that sufficiently compensate us for our losses.

We may need to license intellectual property from third parties, and such licenses may not be available or may not be available on commercially reasonable terms.

A third party may hold intellectual property, including patent rights, that are important or necessary to the development of our products. It may be necessary for us to use the patented or proprietary technology of a third party to commercialize our own technology or products, in which case we would be required to obtain a license from such third party. A license to such intellectual property may not be available or may not be available on commercially reasonable terms, which could have a material adverse effect on our business and financial condition.

The licensing and acquisition of third-party intellectual property rights is a competitive practice, and companies that 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 larger size and cash resources or greater clinical development and commercialization capabilities. We may not be able to successfully complete such negotiations and ultimately acquire the rights to the intellectual property surrounding the additional product candidates that we may seek to acquire.

Third parties may initiate legal proceedings alleging that we are infringing their intellectual property rights, the outcome of which would be uncertain and could have a material adverse effect on the success of our business.

Our commercial success depends upon our ability, and the ability of our collaborators, to develop, manufacture, market and sell our product candidates and use our proprietary technologies without infringing the proprietary rights of third parties. There is considerable intellectual property litigation in the biotechnology and pharmaceutical industries, as well as administrative proceedings for challenging patents, including interference, reexamination, and ***inter partes*** review proceedings before the USPTO and oppositions and other comparable proceedings in foreign jurisdictions.

We may become party to, or threatened with, future adversarial proceedings or litigation regarding intellectual property rights with respect to our products and technology, including interference, derivation, reexamination or ***inter partes*** review proceedings before the USPTO. Third parties may assert infringement claims against us based on existing patents or patents that may be granted in the future. 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. 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 drug 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.

If we are found by a court of competent jurisdiction to infringe a third party's intellectual property rights, we could be required to obtain a license from such third party to continue developing and marketing our products and technology. However, we may not be able to obtain any required license on commercially reasonable terms or at all. Even if we were able to obtain a license, it could be non-exclusive, thereby giving our competitors access to the same technologies licensed to us. We could be forced, including by court order, to cease commercializing the infringing technology or product. In addition, we could be found liable for monetary damages, including treble damages and attorneys' fees if we are found to have willfully infringed a patent. A finding of infringement could prevent us from commercializing our product candidates or force us to cease some of our business operations, which could materially harm our business. Claims that we have misappropriated the confidential information or trade secrets of third parties could have a similar negative impact on our business.

If we fail to comply with our obligations in our current and future intellectual property licenses and funding arrangements with third parties, we could lose rights that are important to our business.

We are party to a license agreement with Yale that provides us with the foundational intellectual property rights for our PROTAC targeted protein degradation technology. This license agreement imposes diligence, development and commercialization timelines and milestone payment, royalty, insurance and other obligations on us. If we fail to comply with our obligations, including achieving specified milestone events, Yale may have the right to terminate this license, in which event we might not be able to develop, manufacture or market any product that is covered by the intellectual property we in-license from Yale and may face other penalties. Such an occurrence would materially adversely affect our business prospects. For a variety of purposes, we will likely enter into additional licensing and funding arrangements with third parties that may also impose similar obligations on us.

Termination of any of our current or future in-licenses would reduce or eliminate our rights under these agreements and may result in our having to negotiate new or reinstated agreements with less favorable terms or cause us to lose our rights under these agreements, including our rights to important intellectual property or technology. Any of the foregoing could prevent us from commercializing our other product candidates, which could have a material adverse effect on our operating results and overall financial condition.

In addition to the above risks, intellectual property rights that we license in the future may include sublicenses under intellectual property owned by third parties, in some cases through multiple tiers. The actions of our licensors may therefore affect our rights to use our sublicensed intellectual property, even if we are in compliance with all of the obligations under our license agreements. Should our licensors or any of the upstream licensors fail to comply with their obligations under the agreements pursuant to which they obtain the rights that are sublicensed to us, or should such agreements be terminated or amended, our ability to develop and commercialize our product candidates may be materially harmed.

Further, we do not have the right to control the prosecution, maintenance and enforcement of all of our licensed and sublicensed intellectual property, and even when we do have such rights, we may require the cooperation of our licensors and upstream licensors, which may not be forthcoming. For example, under the Yale license, any patent applications and issued patents under the agreement remain the property of Yale, and Yale has the right to choose patent counsel. Our business could be adversely affected if we or our licensors are unable to prosecute, maintain and enforce our licensed and sublicensed intellectual property effectively.

We may be subject to claims by third parties asserting that our employees, consultants, contractors or we have misappropriated their intellectual property, or claiming ownership of what we regard as our own intellectual property.

We employ individuals who were previously employed at universities as well as other biotechnology or pharmaceutical companies, including our competitors or potential competitors. We have received confidential and proprietary information from collaborators, prospective licensees and other third parties. Although we try to ensure that our employees do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that these employees or we have used or disclosed intellectual property, including trade secrets or other proprietary information, of any such employee's former employer. We may also be subject to claims that former employers or other third parties have an ownership interest in our patents. Litigation may be necessary to defend against these claims. We may not be successful in defending these claims, and if we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights, such as exclusive ownership of, or right to use, valuable intellectual property. Even if we are successful, litigation could result in substantial cost and reputational loss and be a distraction to our management and other employees.

In addition, while it is our policy to require our employees, consultants and contractors who may be involved in the development of intellectual property to execute agreements assigning such intellectual property to us, we may be unsuccessful in executing such an agreement with each party who in fact develops intellectual property that we regard as our own. Such assignment agreements may not be self-executing or may be breached, and we may be forced to bring claims against third parties, or defend claims they may bring against us, to determine the ownership of what we regard as our intellectual property.

Intellectual property litigation could cause us to spend substantial resources and distract our personnel from their normal responsibilities.

Even if resolved in our favor, litigation or other legal proceedings relating to intellectual property claims may cause us to incur significant expenses, and could distract our technical and management personnel from their normal responsibilities. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments and 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. Such litigation or proceedings could substantially increase our operating losses and reduce the resources available for development activities or any future sales, marketing or distribution activities. We may not have sufficient financial or other resources to conduct such litigation or proceedings adequately. Some of our competitors may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their greater financial resources. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could compromise our ability to compete in the marketplace.

Obtaining and maintaining our patent protection depends on compliance with various procedural, documentary, fee payment and other requirements imposed by governmental patent offices, 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 patent offices in foreign countries in several stages over the lifetime of the patent. The USPTO and patent offices in foreign countries require compliance with a number of procedural, documentary, fee payment and other requirements 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 a patent or patent rights in the relevant jurisdiction. Non-compliance 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.

If we are unable to protect the confidentiality of our trade secrets, our business and competitive position would be harmed.

In addition to seeking patents for some of our technology and product candidates, we also rely on trade secrets, including unpatented know-how, technology and other proprietary information, to maintain our competitive position. We seek to protect these trade secrets, in part, by entering into non-disclosure and confidentiality agreements with parties who have access to them, such as our employees, corporate collaborators, outside scientific collaborators, contract manufacturers, consultants, advisors and other third parties. We also enter into confidentiality and invention or patent assignment agreements with our employees and consultants. Despite these efforts, any of these parties may breach the agreements and disclose our proprietary information, including our trade secrets, and we may not be able to obtain adequate remedies for such breaches. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret is difficult, expensive and time-consuming, and the outcome is unpredictable. In addition, some courts inside and outside of the United States are less willing or unwilling to protect trade secrets. If any of our trade secrets were to be lawfully obtained or independently developed by a competitor, we would have no right to prevent them, or those to whom they communicate it, from using that technology or information to compete with us. If any of our trade secrets were to be disclosed to or independently developed by a competitor, our competitive position would be harmed.

If we are not able to obtain patent term extensions in the United States under the Hatch-Waxman Act and in foreign countries under similar legislation, thereby potentially extending the term of our marketing exclusivity for our product candidates, our business may be impaired.

Depending upon the timing, duration and specifics of FDA marketing approval of our product candidates, one of the U.S. patents covering each of such product candidates or the use thereof may be eligible for a patent term extension under the Drug Price Competition and Patent Term Restoration Act of 1984, or Hatch-Waxman Act. The period of extension may be up to five years beyond the expiration date of a patent, but cannot extend the remaining term of a patent beyond a total of 14 years from the date of product approval. The Hatch-Waxman Act allows a maximum of one patent to be extended per FDA-approved product. Similar patent term extension also may be available in certain foreign countries upon regulatory approval of our product candidates. Nevertheless, we may not be granted patent term extension either in the United States or in any foreign country because of, for example, failing to apply within applicable deadlines, failing to apply prior to expiration of relevant patents or otherwise failing to satisfy applicable requirements. Moreover, the term of extension, as well as the scope of patent protection during any such extension, afforded by the governmental authority could be less than we request.

If we are unable to obtain patent term extension or restoration, or the term of any such extension is less than we request, the period during which we will have the right to exclusively market our product may be shortened and our competitors may obtain approval of competing products following our patent expiration sooner, and our revenue could be reduced, possibly materially.

We only have limited geographical protection with respect to certain patents and we may not be able to protect our intellectual property rights throughout the world.

Filing, prosecuting and defending patents covering our 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-licensing patents covering our product candidates in all countries throughout the world may similarly be prohibitively expensive, if such opportunities are available at all. And in-licensing or filing, prosecuting and defending patents even in only those jurisdictions in which we develop or commercialize our product candidates may be prohibitively expensive or impractical. Competitors may use our and our licensors' technologies in jurisdictions where we have not obtained patent protection or licensed patents to develop their own products and, further, may export otherwise infringing products to territories where we and our licensors have patent protection, but enforcement is not as strong as that in the United States or the European Union. These products may compete with our product candidates, and our or our licensors' patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

In addition, we may decide to abandon national and regional patent applications while they are still pending. The grant proceeding of each national or regional patent is an independent proceeding which may lead to situations in which applications may be rejected by the relevant patent office, while substantively similar applications are granted by others. For example, relative to other countries, China has a heightened detailed description requirement for patentability. Furthermore, generic drug manufacturers or other competitors may challenge the scope, validity or enforceability of our or our licensors' patents, requiring us or our licensors to engage in complex, lengthy and costly litigation or other proceedings. Generic drug manufacturers may develop, seek approval for and launch generic versions of our products. It is also quite common that depending on the country, the scope of patent protection may vary for the same product candidate or technology.

The laws of some jurisdictions do not protect intellectual property rights to the same extent as the laws or regulations in the United States and the European Union, and many companies have encountered significant difficulties in protecting and defending proprietary rights in such jurisdictions. Moreover, the legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents, trade secrets or other forms of intellectual property, which could make it difficult for us to prevent competitors in some jurisdictions from marketing competing products in violation of our proprietary rights generally.

Proceedings to enforce our patent rights in foreign jurisdictions, whether or not successful, are likely to result in substantial costs and divert our efforts and attention from other aspects of our business, and additionally could put our or our licensors' patents at risk of being invalidated or interpreted narrowly, could increase the risk of our or our licensors' patent applications not issuing, or could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate, while damages or other remedies may be awarded to the adverse party, which may be commercially significant. If we prevail, damages or other remedies awarded to us, 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. Furthermore, while we intend to protect our intellectual property rights in our expected significant markets, we cannot ensure that we will be able to initiate or maintain similar efforts in all jurisdictions in which we may wish to market our product candidates. Accordingly, our efforts to protect our intellectual property rights in such countries may be inadequate, which may have an adverse effect on our ability to successfully commercialize our product candidates in all of our expected significant foreign markets. If we or our licensors encounter difficulties in protecting, or are otherwise precluded from effectively protecting, the intellectual property rights important for our business in such jurisdictions, the value of these rights may be diminished and we may face additional competition in those jurisdictions.

In some jurisdictions, compulsory licensing laws compel patent owners to grant licenses to third parties. In addition, some countries limit the enforceability of patents against government agencies or government contractors. In these countries, the patent owner may have limited remedies, which could materially diminish the value of such patent. If we or any of our licensors are forced to grant a license to third parties under patents relevant to our business, or if we or our licensors are prevented from enforcing patent rights against third parties, our competitive position may be substantially impaired in such jurisdictions.

Risks Related to Regulatory Approval and Marketing of Our Product Candidates and Other Legal Compliance Matters

The regulatory approval process of the FDA is lengthy, time-consuming and inherently unpredictable, and if we are ultimately unable to obtain marketing approval for our product candidates, our business will be substantially harmed.

The time required to obtain approval by the FDA is unpredictable but typically takes many years following the commencement of clinical trials and depends upon numerous factors, including the substantial discretion of the regulatory authorities. In addition, approval policies, regulations or the type and amount of clinical data necessary to gain approval may change during the course of a product candidate's clinical development and may vary among jurisdictions. We have not obtained marketing approval for any product candidate and it is possible that none of our existing product candidates, or any product candidates we may seek to develop in the future will ever obtain marketing approval.

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

- the FDA may disagree with the design or implementation of our clinical trials;
- we may be unable to demonstrate to the satisfaction of the FDA that a product candidate is safe and effective for its proposed indication;
- results of clinical trials may not meet the level of statistical significance required by the FDA for approval;
- we may be unable to demonstrate that a product candidate's clinical and other benefits outweigh its safety risks;
- the FDA may disagree with our interpretation of data from preclinical studies or clinical trials;
- data collected from clinical trials of our product candidates may not be sufficient to support the submission of an NDA to the FDA or other submission or to obtain marketing approval in the United States;
- the FDA 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 may significantly change in a manner rendering our clinical data insufficient for approval.

This lengthy approval process as well as the unpredictability of future clinical trial results may result in our failing to obtain regulatory approval to market any of our product candidates, which would significantly harm our business, results of operations and prospects. The FDA has substantial discretion in the approval process, and determining when or whether regulatory approval will be obtained for any of our product candidates. Even if we believe the data collected from clinical trials of our product candidates are promising, such data may not be sufficient to support approval by the FDA.

In addition, even if we were to obtain approval, regulatory authorities may approve any of our product candidates for fewer or more limited indications than we request, may not approve the price we intend to charge for our products, may grant approval contingent on the performance of costly post-marketing clinical trials, or may approve a product candidate with a label that does not include the labeling claims necessary or desirable for the successful commercialization of that product candidate. Any of the foregoing scenarios could materially harm the commercial prospects for our product candidates.

Even if we complete the necessary preclinical studies and clinical trials, the marketing approval process is expensive, time-consuming and uncertain and may prevent us from obtaining approvals for the commercialization of some or all of our product candidates. If we are not able to obtain, or if there are delays in obtaining, required regulatory approvals, we will not be able to commercialize our product candidates, and our ability to generate revenue will be materially impaired.

Our product candidates and the activities associated with their development and commercialization, including their design, testing, manufacture, safety, efficacy, recordkeeping, labeling, storage, approval, advertising, promotion, sale and distribution, export and import are subject to comprehensive regulation by the FDA and other regulatory agencies in the United States and by the EMA and similar regulatory authorities outside of the United States. Failure to obtain marketing approval for a product candidate will prevent us from commercializing the product candidate. We have not submitted an application for or received marketing approval for any of our product candidates in the United States or in any other jurisdiction.

As a company, we do not have experience in filing and supporting the applications necessary to gain marketing approvals and expect to rely on third-party clinical research organizations or other third-party consultants or vendors to assist us in this process. Securing marketing approval requires the submission of extensive preclinical and clinical data and supporting information to regulatory authorities for each therapeutic indication to establish the product candidate's safety and efficacy. Securing marketing approval also requires the submission of information about the product manufacturing process to, and inspection of manufacturing facilities by, the regulatory authorities. Our product candidates may not be effective, may be only moderately effective or may prove to have undesirable or unintended side effects, toxicities or other characteristics that may preclude our obtaining marketing approval or prevent or limit commercial use. New cancer drugs frequently are indicated only for patient populations that have not responded to an existing therapy or have relapsed.

The process of obtaining marketing approvals, both in the United States and abroad, is expensive, may take many years, if approval is obtained at all, and can vary substantially based upon a variety of factors, including the type, complexity and novelty of the product candidates involved. Changes in marketing approval policies during the development period, changes in or the enactment of additional statutes or regulations, or changes in regulatory review for each submitted product application, may cause delays in the approval or rejection of an application. Regulatory authorities have substantial discretion in the approval process and may refuse to accept any application or may decide that our data is insufficient for approval and require additional preclinical, clinical or other studies. In addition, varying interpretations of the data obtained from preclinical and clinical testing could delay, limit or prevent marketing approval of a product candidate. Any marketing approval we ultimately obtain may be limited or subject to restrictions or post-approval commitments that render the approved product not commercially viable.

If we experience delays in obtaining approval or if we fail to obtain approval of our product candidates, the commercial prospects for our product candidates may be harmed and our ability to generate revenues will be materially impaired.

Failure to obtain marketing approval in foreign jurisdictions would prevent our product candidates from being marketed abroad and may limit our ability to generate revenue from product sales.

In order to market and sell our products in the European Union and many other jurisdictions, we, and any collaborators, must obtain separate marketing approvals and comply with numerous and varying regulatory requirements. The approval procedure varies among countries and can involve additional testing. The time required to obtain approval may differ substantially from that required to obtain FDA approval. The marketing approval process outside the United States generally includes all of the risks associated with obtaining FDA approval. We, and any collaborators, may not obtain approvals from regulatory authorities outside the United States on a timely basis, if at all. Approval by the FDA does not ensure approval by regulatory authorities in other countries or jurisdictions, and approval by one regulatory authority outside the United States does not ensure approval by regulatory authorities in other countries or jurisdictions or by the FDA.

In many countries outside the United States, a product candidate must also be approved for reimbursement before it can be sold in that country. In some cases, the price that we intend to charge for our products, if approved, is also subject to approval. Obtaining non-U.S. regulatory approvals and compliance with non-U.S. regulatory requirements could result in significant delays, difficulties and costs for us and any collaborators and could delay or prevent the introduction of our product candidates in certain countries. In addition, if we or any collaborators fail to obtain the non-U.S. approvals required to market our product candidates outside the United States or if we or any collaborators fail to comply with applicable non-U.S. regulatory requirements, our target market will be reduced and our ability to realize the full market potential of our product candidates will be harmed and our business, financial condition, results of operations and prospects may be adversely affected.

Additionally, on June 23, 2016, the electorate in the United Kingdom voted in favor of leaving the European Union, commonly referred to as Brexit. On March 29, 2017, the United Kingdom formally notified the European Union of its intention to withdraw pursuant to Article 50 of the Lisbon Treaty. Since a significant proportion of the regulatory framework in the United Kingdom is derived from European Union directives and regulations, the withdrawal could materially impact the regulatory regime with respect to the approval of our product candidates in the United Kingdom or the European Union. Any delay in obtaining, or an inability to obtain, any marketing approvals, as a result of Brexit or otherwise, would prevent us from commercializing our product candidates in the United Kingdom and/or the European Union and restrict our ability to generate revenue and achieve and sustain profitability. If any of these outcomes occur, we may be forced to restrict or delay efforts to seek regulatory approval in the United Kingdom and/or European Union for our product candidates, which could significantly and materially harm our business.

The United Kingdom has a period of a maximum of two years from the date of its formal notification to negotiate the terms of its withdrawal from, and future relationship with, the European Union. If no formal withdrawal agreement is reached between the United Kingdom and the European Union, then it is expected the United Kingdom's membership of the European Union will automatically terminate two years after the submission of the notification of the United Kingdom's intention to withdraw from the European Union. Discussions between the United Kingdom and the European Union focused on finalizing withdrawal issues and transition agreements are ongoing. However, limited progress to date in these negotiations and ongoing uncertainty within the UK Government and Parliament sustains the possibility of the United Kingdom leaving the European Union on March 29, 2019 without a withdrawal agreement and associated transition period in place, which is likely to cause significant market and economic disruption.

Even if we, or any collaborators, obtain marketing approvals for our product candidates, the terms of approvals and ongoing regulation of our products may limit how we, or they, manufacture and market our products, which could materially impair our ability to generate revenue.

Once marketing approval has been granted, an approved product and its manufacturer and marketer are subject to ongoing review and extensive regulation. We, and any collaborators, must therefore comply with requirements concerning advertising and promotion for any of our product candidates for which we or they obtain marketing approval. Promotional communications with respect to prescription drugs are subject to a variety of legal and regulatory restrictions and must be consistent with the information in the product's approved labeling. Thus, we, and any collaborators will not be able to promote any products we develop for indications or uses for which they are not approved.

In addition, manufacturers of approved products and those manufacturers' facilities are required to comply with extensive FDA requirements, including ensuring that quality control and manufacturing procedures conform to cGMPs, which include requirements relating to quality control and quality assurance as well as the corresponding maintenance of records and documentation and reporting requirements. We, our third-party manufacturers, any collaborators and their third-party manufacturers could be subject to periodic unannounced inspections by the FDA to monitor and ensure compliance with cGMPs.

Accordingly, assuming we, or any collaborators, receive marketing approval for one or more of our product candidates, we, and any collaborators, and our respective third-party manufacturers will continue to expend time, money and effort in all areas of regulatory compliance, including manufacturing, production, product surveillance and quality control.

If we, and any collaborators, are not able to comply with post-approval regulatory requirements, we, and any collaborators, could have the marketing approvals for our products withdrawn by regulatory authorities and our, or any collaborators', ability to market any future products could be limited, which could adversely affect our ability to achieve or sustain profitability. Further, the cost of compliance with post-approval regulations may have a negative effect on our operating results and financial condition.

Any product candidate for which we, or any collaborators, obtain marketing approval could be subject to post-marketing restrictions or withdrawal from the market and we, or any collaborators, may be subject to substantial penalties if we, or they, fail to comply with regulatory requirements or if we, or they, experience unanticipated problems with our products when and if any of them are approved.

Any product candidate for which we, or any collaborators, obtain marketing approval, as well as the manufacturing processes, post-approval clinical data, labeling, advertising and promotional activities for such product, will be subject to continual requirements of and review by the FDA, EMA and other regulatory authorities. These requirements include submissions of safety and other post-marketing information and reports, registration and listing requirements, cGMP requirements relating to manufacturing, quality control, quality assurance and corresponding maintenance of records and documents, requirements regarding the distribution of samples to physicians and recordkeeping. Even if marketing approval of a product candidate is granted, the approval may be subject to limitations on the indicated uses for which the product may be marketed or to the conditions of approval, including the requirement to implement a risk evaluation and mitigation strategy. New cancer drugs frequently are indicated only for patient populations that have not responded to an existing therapy or have relapsed. If any of our product candidates receives marketing approval, the accompanying label may limit the approved use of our drug in this way, which could limit sales of the product.

The FDA may also impose requirements for costly post-marketing studies or clinical trials and surveillance to monitor the safety or efficacy of the product, including the adoption and implementation of risk evaluation and mitigation strategies. The FDA and other agencies, including the Department of Justice, or the DOJ, closely regulate and monitor the post-approval marketing and promotion of drugs to ensure they are marketed and distributed only for the approved indications and in accordance with the provisions of the approved labeling. The FDA and DOJ impose stringent restrictions on manufacturers' communications regarding off-label use, and if we do not market our products for their approved indications, we may be subject to enforcement action for off-label marketing. Violations of the Federal Food, Drug, and Cosmetic Act and other statutes, including the False Claims Act, relating to the promotion and advertising of prescription drugs may lead to investigations and enforcement actions alleging violations of federal and state healthcare fraud and abuse laws, as well as state consumer protection laws.

In addition, later discovery of previously unknown side effects or other problems with our products or their manufacturers or manufacturing processes, or failure to comply with regulatory requirements, may yield various results, including:

- restrictions on such products, manufacturers or manufacturing processes;
- restrictions and warnings on the labeling or marketing of a product;
- restrictions on product distribution or use;
- requirements to conduct post-marketing studies or clinical trials;
- warning letters or untitled letters;
- withdrawal of the products from the market;
- refusal to approve pending applications or supplements to approved applications that we submit;
- recall of products;
- fines, restitution or disgorgement of profits or revenues;
- suspension or withdrawal of marketing approvals;
- damage to relationships with any potential collaborators;
- unfavorable press coverage and damage to our reputation;
- refusal to permit the import or export of our products;
- product seizure;
- injunctions or the imposition of civil or criminal penalties; or
- litigation involving patients using our products.

Non-compliance with European Union requirements regarding safety monitoring or pharmacovigilance, and with requirements related to the development of products for the pediatric population, can also result in significant financial penalties. Similarly, failure to comply with the European Union's requirements regarding the protection of personal information can also lead to significant penalties and sanctions.

In addition, manufacturers of approved products and those manufacturers' facilities are required to comply with extensive FDA requirements, including ensuring that quality control and manufacturing procedures conform to cGMPs applicable to drug manufacturers or quality assurance standards applicable to medical device manufacturers, which include requirements relating to quality control and quality assurance as well as the corresponding maintenance of records and documentation and reporting requirements. We, any contract manufacturers we may engage in the future, our collaborators and their contract manufacturers will also be subject to other regulatory requirements, including submissions of safety and other post-marketing information and reports, registration and listing requirements, requirements regarding the distribution of samples to clinicians, recordkeeping, and costly post-marketing studies or clinical trials and surveillance to monitor the safety or efficacy of the product such as the requirement to implement a risk evaluation and mitigation strategy.

Regulatory reform may limit the FDA's ability to engage in oversight and implementation activities in the normal course, and that could negatively impact our business.

The Trump Administration has taken several executive actions, including the issuance of a number of executive orders, that could impose significant burdens on, or otherwise materially delay, the FDA's ability to engage in routine regulatory and oversight activities such as implementing statutes through rulemaking, issuance of guidance, and review and approval of marketing applications. On January 30, 2017, President Trump issued an executive order, applicable to all executive agencies, including the FDA, that requires that for each notice of proposed rulemaking or final regulation to be issued in fiscal year 2017, the agency shall identify at least two existing regulations to be repealed, unless prohibited by law. These requirements are referred to as the "two-for-one" provisions. This executive order includes a budget neutrality provision that requires the total incremental cost of all new regulations in the 2017 fiscal year, including repealed regulations, to be no greater than zero, except in limited circumstances. For fiscal years 2018 and beyond, the executive order requires agencies to identify regulations to offset any incremental cost of a new regulation. In interim guidance issued by the Office of Information and Regulatory Affairs within the Office of Management and Budget on February 2, 2017, the administration indicates that the "two-for-one" provisions may apply not only to agency regulations, but also to significant agency guidance documents. It is difficult to predict how these requirements will be implemented, and the extent to which they will impact the FDA's ability to exercise its regulatory authority. If these executive actions impose constraints on FDA's ability to engage in oversight and implementation activities in the normal course, our business may be negatively impacted.

Our relationships with health care providers, physicians and third-party payors will be subject to applicable anti-kickback, fraud and abuse and other health care laws and regulations, which could expose us to civil, criminal and administrative sanctions, contractual damages, reputational harm and diminished future profits and earnings.

Health care providers, physicians and third-party payors will play a primary role in the recommendation and prescription of any drugs for which we obtain marketing approval. Our future arrangements with third-party payors, health care providers and physicians may expose us to broadly applicable state and federal fraud and abuse and other health care laws and regulations that may constrain the business or financial arrangements and relationships through which we market, sell and distribute any drugs for which we obtain marketing approval. These include the following:

- *Anti-Kickback Statute,* which prohibits, among other things, persons and entities from knowingly and willfully soliciting, offering, paying, or receiving remuneration, directly or indirectly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchasing, ordering, leasing, arranging for, or recommending the purchasing, ordering, or leasing of, any good or service for which payment may be made, in whole or in part, under a federal health care program such as Medicare or Medicaid;
- *False Claims Act*—the federal civil and criminal false claims laws, including the civil False Claims Act, and Civil Monetary Penalties Law, which prohibit individuals or entities from, among other things, knowingly presenting, or causing to be presented, to the federal government, false or fraudulent claims for payment or knowingly making, using or causing to made or used a false record or statement material to a false or fraudulent claim or to avoid, decrease or conceal an obligation to pay money to the federal government, or knowingly concealing or knowingly and improperly avoiding or decreasing an obligation to pay money to the federal government;

- *HIPAA*—the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, which created additional federal criminal statutes that prohibit, among other things, executing a scheme to defraud any health care benefit program or making false statements relating to health care matters, and apply regardless of the payor (e.g., public or private);
- *HIPAA and HITECH*—HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, or HITECH, and their implementing regulations, which impose obligations on HIPAA covered entities and their business associates, including mandatory contractual terms and required implementation of administrative, physical and technical safeguards to maintain the privacy and security of individually identifiable health information;
- *Transparency Requirements*—the federal physician transparency requirements known as the Physician Payments Sunshine Act, under the Patient Protection and Affordable Care Act, as amended by the Health Care Education Reconciliation Act, or the Affordable Care Act (ACA), which requires manufacturers of drugs, medical devices, biological and medical supplies covered by Medicare, Medicaid, or State Children's Health Insurance Program (CHIP) to report annually to the Centers for Medicare & Medicaid Services, or CMS, within the United States Department of Health and Human Services, 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, Local and Foreign Laws*—analogous state, local and foreign fraud and abuse laws and regulations, such as state anti-kickback and false claims laws, which may be broader than similar federal laws, can apply to claims involving health care items or services regardless of payor, and are enforced by many different federal and state agencies as well as through private actions.

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 and require drug manufacturers to report information related to payments and other transfers of value to physicians and other health care 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 pre-empted by HIPAA, thus complicating compliance efforts.

Efforts to ensure that our business arrangements with third parties will comply with applicable health care laws and regulations will involve substantial costs. It is possible that governmental authorities will conclude that our business practices may not comply with current or future statutes, regulations or case law involving applicable fraud and abuse or other health care laws and regulations. If our operations are found to be in violation of any of these laws or any other governmental regulations that may apply to us, we may be subject to significant civil, criminal and/or administrative penalties, damages, fines, individual imprisonment, disgorgement, exclusion from government funded health care programs, such as Medicare and Medicaid, contractual damages, reputational harm, administrative burdens, diminished profits and future earnings, additional reporting obligations and oversight if we become subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance with these laws and the curtailment or restructuring of our operations. If any of the physicians or other health care providers or entities with whom we expect to do business is found to be not in compliance with applicable laws, they may be subject to criminal, civil or administrative sanctions, including exclusions from government funded health care programs.

The provision of benefits or advantages to physicians to induce or encourage the prescription, recommendation, endorsement, purchase, supply, order or use of medicinal products is also prohibited in the European Union. The provision of benefits or advantages to physicians is governed by the national anti-bribery laws of European Union Member States, such as the U.K. Bribery Act 2010, or the Bribery Act. Infringement of these laws could result in substantial fines and imprisonment.

Payments made to physicians in certain European Union Member States must be publicly disclosed. Moreover, agreements with physicians often must be the subject of prior notification and approval by the physician's employer, his or her competent professional organization and/or the regulatory authorities of the individual European Union Member States. These requirements are provided in the national laws, industry codes or professional codes of conduct, applicable in the European Union Member States. Failure to comply with these requirements could result in reputational risk, public reprimands, administrative penalties, fines or imprisonment.

The collection, use, disclosure, transfer, or other processing of personal data regarding individuals in the EU, including personal health data, is subject to the EU General Data Protection Regulation, or the GDPR, which became effective on May 25, 2018. The GDPR is wide-ranging in scope and imposes numerous requirements on companies that process personal data, including requirements relating to processing health and other sensitive data, obtaining consent of the individuals to whom the personal data relates, providing information to individuals regarding data processing activities, implementing safeguards to protect the security and confidentiality of personal data, providing notification of data breaches, and taking certain measures when engaging third-party processors. The GDPR also imposes strict rules on the transfer of personal data to countries outside the EU, including the United States, and permits data protection authorities to impose large penalties for violations of the GDPR, including potential fines of up to €20 million or 4% of annual global revenues, whichever is greater. The GDPR also confers a private right of action on data subjects and consumer associations to lodge complaints with supervisory authorities, seek judicial remedies, and obtain compensation for damages resulting from violations of the GDPR. Compliance with the GDPR will be a rigorous and time-intensive process that may increase our cost of doing business or require us to change our business practices, and despite those efforts, there is a risk that we may be subject to fines and penalties, litigation, and reputational harm in connection with any European activities.

Current and future legislation may increase the difficulty and cost for us and any collaborators to obtain marketing approval of and commercialize our product candidates and affect the prices we, or they, may obtain.

In the United States and some foreign jurisdictions, there have been a number of legislative and regulatory changes and proposed changes regarding the healthcare system that could prevent or delay marketing approval of our product candidates, restrict or regulate post-approval activities and affect our ability to profitably sell any product candidates for which we obtain marketing approval. The pharmaceutical industry has been a particular focus of these efforts and has been significantly affected by legislative initiatives. Current laws, as well as other healthcare reform measures that may be adopted in the future, may result in more rigorous coverage criteria and in additional downward pressure on the price that we receive for any FDA approved product.

In the United States, the Medicare Prescription Drug, Improvement, and Modernization Act of 2003, or the MMA, changed the way Medicare covers and pays for pharmaceutical products. The legislation expanded Medicare coverage for drug purchases by the elderly and introduced a new reimbursement methodology based on average sales prices for physician-administered drugs. In addition, this legislation provided authority for limiting the number of drugs that will be covered in any therapeutic class. Cost reduction initiatives and other provisions of this legislation could decrease the coverage and price that we receive for any approved products. While the MMA applies only to drug benefits for Medicare beneficiaries, private payors often follow Medicare coverage policy and payment limitations in setting their own reimbursement rates. Therefore, any reduction in reimbursement that results from the MMA may result in a similar reduction in payments from private payors.

In March 2010, then-President Obama signed into law the ACA. Among the provisions of the ACA of importance to our business and our product candidates are the following:

- an annual, non-deductible fee on any entity that manufactures or imports specified branded prescription drugs and biologic agents;
- an increase in the statutory minimum rebates a manufacturer must pay under the Medicaid Drug Rebate Program;
- expansion of federal healthcare fraud and abuse laws, including the civil False Claims Act and the federal Anti-Kickback Statute, new government investigative powers and enhanced penalties for noncompliance;
- a new Medicare Part D coverage gap discount program, in which manufacturers must agree to offer 50% (and 70% starting January 1, 2019) point-of-sale discounts off negotiated prices;
- extension of manufacturers' Medicaid rebate liability;
- expansion of eligibility criteria for Medicaid programs;
- expansion of the entities eligible for discounts under the Public Health Service pharmaceutical pricing program;
- new requirements to report certain financial arrangements with physicians and teaching hospitals;

- a new requirement to annually report drug samples that manufacturers and distributors provide to physicians; and
- a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research.

In addition, other legislative changes have been proposed and adopted since the ACA was enacted. These changes include the Budget Control Act of 2011, which, among other things, led to aggregate reductions to Medicare payments to providers of up to 2% per fiscal year that started in 2013 and, due to subsequent legislative amendments to the statute, will stay in effect through 2027 unless additional congressional action is taken, and the American Taxpayer Relief Act of 2012, which, among other things, reduced Medicare payments to several types of providers and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. These new laws may result in additional reductions in Medicare and other healthcare funding and otherwise affect the prices we may obtain for any of our product candidates for which we may obtain marketing approval or the frequency with which any such product candidate is prescribed or used. Further, there have been several recent U.S. congressional inquiries and proposed state and federal legislation designed to, among other things, bring more transparency to drug pricing, review the relationship between pricing and manufacturer patient programs, reduce the costs of drugs under Medicare and reform government program reimbursement methodologies for drug products.

We expect that these healthcare reforms, as well as other healthcare reform measures that may be adopted in the future, may result in additional reductions in Medicare and other healthcare funding, more rigorous coverage criteria, new payment methodologies and additional downward pressure on the price that we receive for any approved product and/or the level of reimbursement physicians receive for administering any approved product we might bring to market. Reductions in reimbursement levels may negatively impact the prices we receive or the frequency with which our products are prescribed or administered. Any reduction in reimbursement from Medicare or other government programs may result in a similar reduction in payments from private payors.

With enactment of the Tax Cuts and Jobs Act of 2017, which was signed by the President on December 22, 2017, Congress repealed the "individual mandate." The repeal of this provision, which requires most Americans to carry a minimal level of health insurance, became effective on January 1, 2019. According to the Congressional Budget Office, the repeal of the individual mandate will cause 13 million fewer Americans to be insured in 2027 and premiums in insurance markets may rise. Additionally, on January 22, 2018, President Trump signed a continuing resolution on appropriations for fiscal year 2018 that delayed the implementation of certain ACA-mandated fees, including the so-called "Cadillac" tax on certain high cost employer-sponsored insurance plans, the annual fee imposed on certain health insurance providers based on market share, and the medical device excise tax on non-exempt medical devices. Further, the Bipartisan Budget Act of 2018, among other things, amends the ACA, effective January 1, 2019, to increase from 50 percent to 70 percent the point-of-sale discount that is owed by pharmaceutical manufacturers who participate in Medicare Part D and to reduce the coverage gap in most Medicare drug plans, commonly referred to as the "donut hole." Further, each chamber of the Congress has put forth multiple bills designed to repeal or repeal and replace portions of the ACA. Although none of these measures has been enacted by Congress to date, Congress may consider other legislation to repeal and replace elements of the ACA.

The Trump Administration has also taken executive actions to undermine or delay implementation of the ACA. Since January 2017, President Trump has signed two Executive Orders designed to delay the implementation of certain provisions of the ACA or otherwise circumvent some of the requirements for health insurance mandated by the ACA. One Executive Order directs 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 or regulatory burden on states, individuals, healthcare providers, health insurers, or manufacturers of pharmaceuticals or medical devices. The second Executive Order terminates the cost-sharing subsidies that reimburse insurers under the ACA. 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 ACA for plans sold through such marketplaces. Further, on June 14, 2018, U.S. Court of Appeals for the Federal Circuit ruled that the federal government was not required to pay more than $12 billion in ACA risk corridor payments to third-party payors who argued were owed to them. The effects of this gap in reimbursement on third-party payors, the viability of the ACA marketplace, providers, and potentially our business, are not yet known.

The costs of prescription pharmaceuticals have also been the subject of considerable discussion in the United States, and members of Congress and the Trump administration have stated that they will address such costs through new legislative and administrative measures. To date, there have been several recent U.S. congressional inquiries and proposed and enacted state and federal legislation designed to, among other things, bring more transparency to drug pricing, review the relationship between pricing and manufacturer patient programs, reduce the costs of drugs under Medicare and reform government program reimbursement methodologies for drug products. At the federal level, the Trump administration's budget proposal for fiscal year 2019 contains further drug price control measures that could be enacted during the 2019 budget process or in other future legislation, including, for example, measures to permit Medicare Part D plans to negotiate the price of certain drugs under Medicare Part B, to allow some states to negotiate drug prices under Medicaid, and to eliminate cost sharing for generic drugs for low-income patients. While any proposed measures will require authorization through additional legislation to become effective, Congress and the Trump administration have each indicated that it will continue to seek new legislative and/or administrative measures to control drug costs. At the state level, legislatures are increasingly passing legislation and implementing regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing.

Specifically, there have been several recent U.S. congressional inquiries and proposed federal and proposed and enacted state legislation designed to, among other things, bring more transparency to drug pricing, review the relationship between pricing and manufacturer patient programs, reduce the costs of drugs under Medicare and reform government program reimbursement methodologies for drug products. At the federal level, Congress and the Trump administration have each indicated that it will continue to seek new legislative and/or administrative measures to control drug costs. For example, on May 11, 2018, the Administration issued a plan to lower drug prices. Under this blueprint for action, the Administration indicated that the Department of Health and Human Services (HHS) will: take steps to end the gaming of regulatory and patent processes by drug makers to unfairly protect monopolies; advance biosimilars and generics to boost price competition; evaluate the inclusion of prices in drug makers' ads to enhance price competition; speed access to and lower the cost of new drugs by clarifying policies for sharing information between insurers and drug makers; avoid excessive pricing by relying more on value-based pricing by expanding outcome-based payments in Medicare and Medicaid; work to give Part D plan sponsors more negotiation power with drug makers; examine which Medicare Part B drugs could be negotiated for a lower price by Part D plans, and improving the design of the Part B Competitive Acquisition Program; update Medicare's drug-pricing dashboard to increase transparency; prohibit Part D contracts that include "gag rules" that prevent pharmacists from informing patients when they could pay less out-of-pocket by not using insurance; and require that Part D plan members be provided with an annual statement of plan payments, out-of-pocket spending, and drug price increases. More recently, on January 31, 2019, the HHS Office of Inspector General proposed modifications to the federal Anti-Kickback Statute discount safe harbor for the purpose of reducing the cost of drug products to consumers which, among other things, if finalized, will affect discounts paid by manufacturers to Medicare Part D plans, Medicaid managed care organizations and pharmacy benefit managers working with these organizations.

At the state level, individual states are increasingly aggressive in passing legislation and implementing regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. In addition, regional health care authorities and individual hospitals are increasingly using bidding procedures to determine what pharmaceutical products and which suppliers will be included in their prescription drug and other health care programs. These measures could reduce the ultimate demand for our products, once approved, or put pressure on our product pricing. We expect that additional state and federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, which could result in reduced demand for our product candidates or additional pricing pressures.

Legislative and regulatory proposals have been made to expand post-approval requirements and restrict sales and promotional activities for pharmaceutical products. We cannot be sure whether additional legislative changes will be enacted, or whether the FDA regulations, guidance or interpretations will be changed, or what the impact of such changes on the marketing approvals of our product candidates, if any, may be. Increased scrutiny by the U.S. Congress of the FDA's approval process may significantly delay or prevent marketing approval, as well as subject us to more stringent product labeling and post-marketing testing and other requirements.

Governments outside of the United States tend to impose strict price controls, which may adversely affect our revenues from the sales of drugs, if any.

In some countries, particularly the countries of the European Union, the pricing of prescription pharmaceuticals is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take considerable time after the receipt of marketing approval for a drug. To obtain reimbursement or pricing approval in some countries, we, or our collaborators, may be required to conduct a clinical trial that compares the cost-effectiveness of our drug to other available therapies. If reimbursement of our drugs is unavailable or limited in scope or amount, or if pricing is set at unsatisfactory levels, our business could be materially harmed.

We are subject to anti-corruption laws, as well as export control laws, customs laws, sanctions laws and other laws governing our operations. If we fail to comply with these laws, we could be subject to civil or criminal penalties, other remedial measures and legal expenses, which could adversely affect our business, results of operations and financial condition.

Our operations are subject to anti-corruption laws, including the FCPA, the Bribery Act, and other anticorruption laws that apply in countries where we do business and may do business in the future. The FCPA, the Bribery Act, and these other laws generally prohibit us, our officers and our employees and intermediaries from bribing, being bribed or making other prohibited payments to government officials or other persons to obtain or retain business or gain some other business advantage. We may in the future operate in jurisdictions that pose a high risk of potential FCPA or Bribery Act violations, and we may participate in collaborations and relationships with third parties whose actions could potentially subject us to liability under the FCPA, the Bribery Act, or local anti-corruption laws. In addition, we cannot predict the nature, scope or effect of future regulatory requirements to which our international operations might be subject or the manner in which existing laws might be administered or interpreted.

We are also subject to other laws and regulations governing our international operations, including regulations administered by the governments of the United States, United Kingdom, and authorities in the European Union, including applicable export control regulations, economic sanctions on countries and persons, customs requirements and currency exchange regulations, which we collectively refer to as Trade Control Laws.

There is no assurance that we will be completely effective in ensuring our compliance with all applicable anti-corruption laws, including the FCPA, the Bribery Act, or other legal requirements, including Trade Control Laws. If we are not in compliance with the FCPA, the Bribery Act, and other anti-corruption laws or Trade Control Laws, we may be subject to criminal and civil penalties, disgorgement and other sanctions and remedial measures, and legal expenses, which could have an adverse impact on our business, financial condition, results of operations and liquidity. The Securities and Exchange Commission, or SEC, also may suspend or bar issuers from trading securities on U.S. exchanges for violations of the FCPA's accounting provisions. Likewise, any investigation of any potential violations of the FCPA, the Bribery Act, other anti-corruption laws or Trade Control Laws by U.S., U.K. or other authorities could also have an adverse impact on our reputation, our business, results of operations and financial condition.

If we fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs that could significantly harm our business.

We are subject to numerous environmental, health and safety laws and regulations, including those governing laboratory procedures and the handling, use, storage, treatment and disposal of hazardous materials and wastes. From time to time and in the future, our operations may involve the use of hazardous and flammable materials, including chemicals and biological materials, and may also produce hazardous waste products. Although we contract with third parties for the disposal of these materials and waste products, we cannot completely eliminate the risk of contamination or injury resulting from these materials. In the event of contamination or injury resulting from the use or disposal of our hazardous materials, we could be held liable for any resulting damages, and any liability could exceed our resources. We also could incur significant costs associated with civil or criminal fines and penalties for failure to comply with such laws and regulations.

We maintain workers' compensation insurance to cover costs and expenses we may incur due to injuries to our employees resulting from the use of hazardous materials, but this insurance may not provide adequate coverage against potential liabilities. We do not maintain insurance for environmental liability or toxic tort claims that may be asserted against us. In addition, we may incur substantial costs in order to comply with current or future environmental, health and safety laws and regulations. Current or future environmental laws and regulations may impair our research, development or production efforts, which could adversely affect our business, financial condition, results of operations or prospects. In addition, failure to comply with these laws and regulations may result in substantial fines, penalties or other sanctions.

Risks Related to Employee Matters and Managing Growth

Our future success depends on our ability to retain key executives and to attract, retain and motivate qualified personnel.

We are highly dependent on the research, development and clinical expertise of our management and scientific teams. Although we have entered into employment agreements with our executive officers, each of them may terminate their employment with us at any time. We also benefit from the research expertise of Professor Craig Crews, Ph.D., our scientific founder and Chief Scientific Advisor. Although we have entered into a consulting agreement with Professor Crews, he may terminate his relationship with us at any time. We do not maintain "key person" insurance for any of our executives or other employees.

Recruiting and retaining qualified scientific, clinical, manufacturing and sales and marketing personnel will also be critical to our success. The loss of the services of our executive officers or other key employees could impede the achievement of our research, development and commercialization objectives and seriously harm our ability to successfully implement our business strategy. Furthermore, replacing executive officers and key employees may be difficult and may take an extended period of time because of the limited number of individuals in our industry with the breadth of skills and experience required to successfully develop, gain marketing approval of and commercialize products. Competition to hire from this limited pool is intense, and we may be unable to hire, train, retain or motivate these key personnel on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies for similar personnel. We also experience competition for the hiring of scientific and clinical personnel from universities and research institutions. In addition, we rely on consultants and advisors, including scientific and clinical advisors, to assist us in formulating our research and development and commercialization strategy. Our consultants and advisors may be employed by employers other than us and may have commitments under consulting or advisory contracts with other entities that may limit their availability to us. If we are unable to continue to attract and retain high quality personnel, our ability to pursue our growth strategy will be limited.

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

As of December 31, 2018, we had 83 full-time employees, including 68 employees engaged in research and development. We expect to experience significant growth in the number of our employees and the scope of our operations, particularly in the areas of drug development, manufacturing, regulatory affairs and, if any of our product candidates receives marketing approval, sales, marketing and distribution. To manage our anticipated future growth, we must continue to implement and improve our managerial, operational and financial systems, expand our facilities and continue to recruit and train additional qualified personnel. 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 ARV-110, ARV-471 and any product candidate we develop, 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 advance development of and, if approved, commercialize ARV-110, ARV-471 and any product candidate we develop will depend, in part, on our ability to effectively manage any future growth. Due to our limited financial resources and the limited experience of our management team in managing a company with such anticipated growth, we may not be able to effectively manage the expansion of our operations or recruit and train additional qualified personnel. The expansion of our operations may lead to significant costs and may divert our management and business development resources. Any inability to manage growth could delay the execution of our business plans or disrupt our operations.

Our internal computer systems, or those of any collaborators, contractors or consultants, may fail or suffer security breaches, which could result in a material disruption of our product development programs.

Our internal computer systems and those of any collaborators, contractors or consultants are vulnerable to damage from computer viruses, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failures. While we have not experienced any such material system failure, accident 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, whether due to a loss of our trade secrets or other proprietary information or other similar disruptions. For example, the loss of clinical trial data from completed or future clinical trials could result in delays in our marketing approval efforts and significantly increase our costs to recover or reproduce the data. To the extent that any disruption or security breach were to result in a loss of, or damage to, our data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur liability, our competitive position could be harmed and the further development and commercialization of our product candidates could be delayed.

Our employees, independent contractors, vendors, principal investigators, CROs and consultants may engage in misconduct or other improper activities, including non-compliance with regulatory standards and requirements and insider trading laws.

We are exposed to the risk that our employees, independent contractors, vendors, principal investigators, CROs and consultants may engage in fraudulent conduct or other illegal activity. Misconduct by these parties could include:

- intentional, reckless or negligent conduct or disclosure of unauthorized activities to us that violate the regulations of the FDA or similar foreign regulatory authorities;
- healthcare fraud and abuse laws and regulations in the United States and abroad;
- violations of U.S. federal securities laws relating to trading in our common stock; and
- failures to reporting of financial information or data accurately.

In particular, sales, marketing and business arrangements in the healthcare industry are subject to extensive laws and regulations intended to prevent fraud, misconduct, kickbacks, self-dealing and other abusive practices. These laws and regulations regulate a wide range of pricing, discounting, marketing and promotion, sales commission, customer incentive programs and other business arrangements. Other forms of misconduct could involve the improper use of information obtained in the course of clinical trials or creating fraudulent data in our preclinical studies or clinical trials, which could result in regulatory sanctions and cause serious harm to our reputation. We have adopted a code of conduct and implement other internal controls applicable to all of our employees, but it is not always possible to identify and deter misconduct by employees and other third parties, and the precautions we take to detect and prevent this activity 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 comply with these laws or regulations. Additionally, we are subject to the risk that a person could allege such fraud or other misconduct, even if none occurred. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, including the imposition of civil, criminal and administrative penalties, damages, 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.

Risks Related to Our Common Stock

The price of our common stock is volatile and may fluctuate substantially, which could result in the loss of all or part of your investment.

Our stock price is volatile. The stock market in general and the market for smaller biopharmaceutical companies in particular have experienced extreme volatility that has often been unrelated to the operating performance of particular companies. The market price for our common stock may be influenced by many factors, including:

- the degree of success of competitive products or technologies;
- results of preclinical studies and clinical trials, of our product candidates or those of our competitors;
- regulatory or legal developments in the United States and other countries;
- developments or disputes concerning patent applications, issued patents or other proprietary rights;
- the recruitment or departure of key personnel;
- the level of expenses related to any of our product candidates or clinical development programs;
- the results of our efforts to discover, develop, acquire or in-license additional technologies or product candidates;
- actual or anticipated changes in estimates as to financial results, development timelines or recommendations by securities analysts;
- variations in our financial results or those of companies that are perceived to be similar to us;
- changes in the structure of healthcare payment systems;
- market conditions in the pharmaceutical and biotechnology sectors;
- general economic, industry and market conditions; and
- the other factors described in this "Risk Factors" section.

If any of the foregoing matters were to occur, or if our operating results fall below the expectations of investors or securities analysts, the price of our common stock could decline substantially. In the past, following periods of volatility in the market price of a company's securities, securities class-action litigation often has been instituted against that company. Such litigation, if instituted against us, could cause us to incur substantial costs to defend such claims and divert management's attention and resources, which could seriously harm our business, financial condition, results of operations and prospects.

Our executive officers, directors and principal stockholders, if they choose to act together, have the ability to control or significantly influence all matters submitted to stockholders for approval.

Our executive officers and directors, combined with our stockholders who owned more than 5% of our outstanding common stock prior to our initial public offering, in the aggregate, beneficially own shares representing more than a majority of our capital stock. As a result, if these stockholders were to choose to act together, they would be able to control all matters submitted to our stockholders for approval, as well as our management and affairs. For example, these persons, if they choose to act together, would control the election of directors and approval of any merger, consolidation or sale of all or substantially all of our assets. This concentration of ownership control may:

- delay, defer or prevent a change in control;
- entrench our management and the board of directors; or
- impede a merger, consolidation, takeover or other business combination involving us that other stockholders may desire.

Provisions in our corporate charter documents, under Delaware law could make an acquisition of our company, which may be beneficial to our stockholders, more difficult and may prevent attempts by our stockholders to replace or remove our current management.

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

- provide for a classified board of directors such that only one of three classes of directors is elected each year;
- allow the authorized number of our directors to be changed only by resolution of our board of directors;
- limit the manner in which stockholders can remove directors from our board of directors;
- provide for advance notice requirements for stockholder proposals that can be acted on at stockholder meetings and nominations to our board of directors;
- require that stockholder actions must be effected at a duly called stockholder meeting and prohibit actions by our stockholders by written consent;
- limit who may call stockholder meetings;
- authorize our board of directors to issue preferred stock without stockholder approval, which could be used to institute a "poison pill" that would work to dilute the stock ownership of a potential hostile acquirer, effectively preventing acquisitions that have not been approved by our board of directors; and
- require the approval of the holders of at least 75% of the votes that all our stockholders would be entitled to cast to amend or repeal specified provisions of our charter or bylaws.

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

An active trading market for our common stock may not develop.

Our shares of common stock began trading on the Nasdaq Global Select Market on September 27, 2018. Given the limited trading history of our common stock, there is a risk that an active trading market for our shares will not be sustained, which could put downward pressure on the market price of our common stock and therefore affect the ability of our stockholders to sell their shares.

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

The trading market for our common stock is influenced by the research and reports that industry or securities analysts publish about us or our business. If no or few securities or industry analysts continue coverage of us, the trading price for our stock could be negatively impacted. If any of the analysts who cover us issue an adverse or misleading opinion regarding us, our business model, our intellectual property or our stock performance, or if our trials or operating results fail to meet the expectations of analysts, our stock price will likely decline. If one or more of these analysts cease coverage of us or fail to publish reports on us regularly, we could lose visibility in the financial markets, which in turn could cause our stock price or trading volume to decline.

A significant portion of our total outstanding shares are eligible to be sold into the market in the near future, which could cause the market price of our common stock to drop significantly, even if our business is doing well.

Sales of a substantial number of shares of our common stock in the public market, or the perception in the market that the holders of a large number of shares intend to sell shares, could reduce the market price of our common stock. As of March 21, 2019, we had 32,328,796 shares of our common stock outstanding. Of these shares, 24,632,009 shares are currently restricted as a result of securities laws or lock-up agreements entered into in our IPO, but will become eligible to be sold at various times after March 25, 2019. Moreover, holders of a significant portion of our common stock have rights, subject to specified conditions, to require us to file registration statements covering their shares or to include their shares in registration statements that we may file for ourselves or other stockholders. In September 2018, we registered all shares of common stock that we may issue under our equity compensation plans. These shares can be freely sold in the public market upon issuance, subject to volume limitations applicable to affiliates and the lock-up agreements entered into in connection with our initial public offering.

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

We are an "emerging growth company," or EGC, as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act. We will remain an EGC until the earlier of: (1) the last day of the fiscal year in which we have total annual gross revenue of $1.07 billion or more; (2) December 31, 2023; (3) the date on which we have issued more than $1 billion in nonconvertible debt during the previous three years; and (4) the date on which we are deemed to be a large accelerated filer under the rules of the SEC, which means the last day of the first year in which the market value of our common stock that is held by non-affiliates exceeds $700 million as of June 30.

We are also a "smaller reporting company," as defined in Rule 12b-2 under the Securities Exchange Act of 1934, as amended. We would cease to be a smaller reporting company if we have a public float in excess of $250 million, or have annual revenues in excess of $100 million and a public float in excess of $700 million, determined on an annual basis.

For so long as we remain an EGC, we are permitted and intend to rely on exemptions from certain disclosure requirements that are applicable to other public companies that are not EGCs. These exemptions include:

- not being required to comply with the auditor attestation requirements in the assessment of our internal control over financial reporting;
- reduced disclosure obligations regarding executive compensation;
- exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved; and
- an exemption from compliance with the requirement of the Public Company Accounting Oversight Board regarding the communication of critical audit matters in the auditor's report on the financial statements.

In addition to the above reduced disclosure requirements applicable to EGCs, as a smaller reporting company, we are permitted and intend to rely on exemptions from certain disclosure requirements that are applicable to other public companies that are not smaller reporting companies. These exemptions include:

- being permitted to provide only two years of audited financial statements in this Annual Report on Form 10-K, with correspondingly reduced "Management's Discussion and Analysis of Financial Condition and Results of Operations" disclosure;
- note being required to furnish a contractual obligations table in "Management's Discussion and Analysis of Financial Condition and Results of Operations"; and
- not being required to furnish a stock performance graph in our annual report.

We may choose to take advantage of some, but not all, of the available exemptions. We cannot predict whether investors will find our common stock less attractive if we rely on certain or all of 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.

In addition, the JOBS Act provides that an EGC may take advantage of an extended transition period for complying with new or revised accounting standards. This allows an EGC to delay the adoption of certain accounting standards until those standards would otherwise apply to private companies. We have irrevocably elected not to avail ourselves of this exemption from new or revised accounting standards and, therefore, we will be subject to the same new or revised accounting standards as other public companies that are not EGCs.

We will incur increased costs as a result of operating as a public company, and our management will be required to devote substantial time to new compliance initiatives and corporate governance practices.

As a public company, and particularly after we are no longer an emerging growth company, we will incur significant legal, accounting and other expenses that we did not incur as a private company. The Sarbanes-Oxley Act of 2002, or Sarbanes-Oxley, the Dodd-Frank Wall Street Reform and Consumer Protection Act, the listing requirements of The Nasdaq Global Market and other applicable securities rules and regulations impose various requirements on public companies, including establishment and maintenance of effective disclosure and financial controls and corporate governance practices. Our management and other personnel will need to devote a substantial amount of time to these compliance initiatives. Moreover, these rules and regulations will increase our legal and financial compliance costs and will make some activities more time-consuming and costly. For example, we expect that these rules and regulations may make it more difficult and more expensive for us to obtain director and officer liability insurance, which in turn could make it more difficult for us to attract and retain qualified members of our board of directors.

We are evaluating these rules and regulations, and cannot predict or estimate the amount of additional costs we may incur or the timing of such costs. These rules and regulations are often subject to varying interpretations, in many cases due to their lack of specificity, and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices.

For as long as we remain an EGC or a smaller reporting company, we may take advantage of certain exemptions from various reporting requirements that are applicable to other public companies that are not EGCs or smaller reporting companies as described in the preceding risk factor.

Pursuant to Section 404 of Sarbanes-Oxley, or Section 404, we will be required to furnish a report by our management on our internal control over financial reporting beginning with the annual report for our fiscal year ending December 31, 2019. However, while we remain an emerging growth company, we will not be required to include an attestation report on internal control over financial reporting issued by our independent registered public accounting firm. To achieve compliance with Section 404 within the prescribed period, we will be engaged in a process to document and evaluate our internal control over financial reporting, which is both costly and challenging. In this regard, we will need to continue to dedicate internal resources, potentially engage outside consultants and adopt a detailed work plan to assess and document the adequacy of internal control over financial reporting, continue steps to improve control processes as appropriate, validate through testing that controls are functioning as documented and implement a continuous reporting and improvement process for internal control over financial reporting. Despite our efforts, there is a risk that we will not be able to conclude, within the prescribed timeframe or at all, that our internal control over financial reporting is effective as required by Section 404. If we identify one or more material weaknesses, it could result in an adverse reaction in the financial markets and restrict our future access to the capital markets due to a loss of confidence in the reliability of our financial statements.

Our certificate of incorporation provides that the Court of Chancery of the State of Delaware will be the exclusive forum for substantially all disputes between us and our stockholders. Our certificate of incorporation further provides that the federal district courts of the United States of America are the sole and exclusive forum for the resolution of any complaint asserting a cause of action arising under the Securities Act. These choice of forum provisions could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers, employees or stockholders.

Our certificate of incorporation provides that the Court of Chancery of the State of Delaware is the exclusive forum for any derivative action or proceeding brought on our behalf, any action asserting a breach of fiduciary duty owed by our directors, officers, other employees or stockholders to the company or our stockholders, any action asserting a claim against us arising pursuant to the Delaware General Corporation Law or as to which the Delaware General Corporation Law confers jurisdiction on the Court of Chancery of the State of Delaware, or any action asserting a claim arising pursuant to our certificate of incorporation or our bylaws or governed by the internal affairs doctrine. Our certificate of incorporation further provides that, unless we consent in writing to the selection of an alternative forum, the federal district

courts of the United States of America shall, to the fullest extent permitted by law, be the sole and exclusive forum for the resolution of any complaint asserting a cause of action arising under the Securities Act. These choice of forum provisions 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, other employees or other stockholders, which may discourage such lawsuits against us and our directors, officers, other employees or other stockholders. Alternatively, if a court were to find this provision 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.

On December 19, 2018, the Delaware Court of Chancery issued a decision declaring that federal forum selection provisions purporting to require claims under the Securities Act be brought in federal court are ineffective and invalid under Delaware law. On January 17, 2019, that decision was appealed to the Delaware Supreme Court. As a result of the Court of Chancery's decision or a decision by the Supreme Court of Delaware affirming the Court of Chancery's decision, we may incur additional costs associated with our federal forum selection provision, which could have an adverse effect on our business, financial condition or results of operations.

Because we do not anticipate paying any cash dividends on our capital stock in the foreseeable future, capital appreciation, if any, will be your sole source of gain.

We have never declared or paid cash dividends on our capital stock. We currently intend to retain all of our future earnings, if any, to finance the growth and development of our business. In addition, the terms of any future debt agreements we may enter into may preclude us from paying dividends. As a result, capital appreciation, if any, of our common stock will be your sole source of gain for the foreseeable future.

Item 1B. Unresolved Staff Comments.

Not applicable.

Item 2. Properties.

We lease approximately 39,000 square feet of office and laboratory space in New Haven, Connecticut under a lease that expires December 21, 2022. We believe that our facilities are sufficient to meet our current needs and that suitable additional space will be available as and when needed.

Item 3. Legal Proceedings.

We are not currently a party to any material legal proceedings.

Item 4. Mine Safety Disclosures.

Not applicable.

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities.

Market Information

Our common stock has been publicly traded on the Nasdaq Global Select Market under the symbol "ARVN" since September 27, 2018 in connection with our initial public offering, or IPO. Prior to that time, there was no public market for our common stock.

Holders

As of March 21, 2019, there were approximately 120 holders of record of our common stock. This number does not include beneficial owners whose shares are held by nominees in street name.

Dividend policy

We have never declared or paid cash dividends on our capital stock. We currently intend to retain all of our future earnings, if any, to finance the growth and development of our business. We do not intend to pay cash dividends in respect of our common stock in the foreseeable future. Any future determination to pay dividends will be made at the discretion of our board of directors and will depend on various factors, including applicable laws, our results of operations, financial condition, future prospects, then applicable contractual restrictions and any other factors deemed relevant by our board of directors. Investors should not purchase our common stock with the expectation of receiving cash dividends.

Recent Sales of Unregistered Securities.

Set forth below is information regarding equity securities sold or issued by us during the fiscal year ended December 31, 2018 that were not registered under the Securities Act of 1933, as amended, or the Securities Act. Also included is the consideration, if any, received by us for such equity securities and information relating to the section of the Securities Act, or rule of the Securities and Exchange Commission, or SEC, under which exemption from registration was claimed.

In March 2018, we issued and sold an aggregate of 16,467,066 of our series C preferred units to investors at a price per unit of $3.34, for an aggregate purchase price of $55,000,000. The series C preferred units were convertible into common units at any time after the date of issuance at the option of the holder. In July 2018, we issued 110,116 of our series A preferred units in connection with the exercise of an outstanding warrant by Connecticut Innovations Incorporated, or CII, at a price per unit of $0.6811, for an aggregate exercise price of $75,000. No underwriters were involved in the foregoing issuances of securities. The securities described in this paragraph were issued to accredited investors in reliance upon the exemption from the registration requirements of the Securities Act, as set forth in Section 4(a)(2) or Regulation D under the Securities Act, relating to transactions by an issuer not involving any public offering.

From January 1, 2018 through December 31, 2018, we issued an aggregate of 1,715,368 incentive units pursuant to our Incentive Share Plan. The incentive unit grants described in this paragraph were issued pursuant to written compensatory plans or arrangements with our employees, directors and consultants, in reliance on the exemption provided by Rule 701 promulgated under the Securities Act, or pursuant to Section 4(a)(2) under the Securities Act, relating to transactions by an issuer not involving any public offering. All recipients either received adequate information about us or had access, through employment or other relationships, to such information.

Immediately prior to the effectiveness of our registration statement on Form S-1 (File No. 333-227112) on September 26, 2018, Arvinas Holding Company, LLC, or Arvinas LLC, our predecessor company, converted from a Delaware limited liability company into Arvinas, Inc., a Delaware corporation, which we refer to as the Conversion. In connection with the Conversion, the series A preferred units of Arvinas LLC converted into shares of series A preferred stock, the series B preferred units of Arvinas LLC converted into shares of series B preferred stock, the series C preferred units of Arvinas LLC converted into shares of series C preferred stock, the common units of Arvinas LLC converted into shares of common stock and the incentive units of Arvinas LLC converted into shares of common stock, and if such outstanding incentive units were subject to vesting at the time of the Conversion, the resulting shares of common stock continued to be subject to vesting to the same extent as such outstanding common shares were subject to time-based vesting prior to the Conversion. On October 1, 2018, upon the completion of our IPO, all of our outstanding shares of convertible preferred stock automatically converted into 19,697,928 shares of common stock at the applicable conversion rate.

Purchase of equity securities

We did not purchase any of our registered equity securities during the period covered by this Annual Report on Form 10-K.

Use of proceeds from registered securities

In October 2018, we closed our initial public offering of an aggregate of 7,700,482 shares of common stock, including 200,482 additional shares of common stock at a subsequent closing upon the exercise in part by the underwriters of their option to purchase additional shares of common stock, at a public offering price of $16.00 per share. The aggregate gross proceeds to us from our IPO were $123.2 million. The offer and sale of all of the shares in the offering were registered under the Securities Act pursuant to registration statement on Form S-1 (File No. 333-227112), which was declared effective by the SEC on September 26, 2018.

Aggregate net proceeds from the offering were approximately $111.0 million, after deducting underwriting discounts and commissions and offering expenses.

As of December 31, 2018, we had used approximately $4.1 million of the net offering proceeds, primarily to fund the advancement of our androgen receptor protein, or AR, and estrogen receptor protein, or ER, programs as well as for working capital and general corporate purposes. We have not used any of the net proceeds from the offering to make payments, directly or indirectly, to any directors or officers of ours or their associates or to persons owning 10% or more of any class of equity securities or to any affiliates of ours. We have invested the remaining net proceeds in a variety of capital preservation investments, including short-term, investment-grade, interest-bearing instruments and U.S. government securities. There has been no material change in our planned use of the net proceeds from the offering as described in our final prospectus filed with the SEC pursuant to Rule 424(b)(4) under the Securities Act on September 27, 2018.

Item 6. Selected 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 Annual Report on Form 10-K and the "Management's Discussion and Analysis of Financial Condition and Results of Operations" section of this Annual Report on Form 10-K. We have derived the consolidated statements of operations data for the years ended December 31, 2018, 2017 and 2016 and the consolidated balance sheet data as of December 31, 2018, 2017 and 2016 from our audited consolidated financial statements. Our historical results are not necessarily indicative of results that should be expected in any future period, and our results for any interim period are not necessarily indicative of results that should be expected for any full year.

	Year Ended December 31,		
	2018	2017	2016
	(in thousands, except share/unit and per share/unit data)		
Statements of Operations Data:			
Revenue	$ 14,324	$ 7,579	$ 6,669
Operating expenses:			
Research and development	45,194	28,793	19,942
General and administrative	12,932	3,546	3,196
Total operating expenses	58,126	32,339	23,138
Loss from operations	(43,802)	(24,760)	(16,469)
Other income (expenses)	2,322	711	2,031
Loss before income taxes	(41,480)	(24,049)	(14,438)
Benefit from income taxes	—	—	87
Net loss	(41,480)	(24,049)	(14,351)
Change in redemption value of preferred units	(198,367)	(4,571)	1,997
Net loss attributable to common shares/units	$ (239,847)	$ (28,620)	$ (12,354)
Net loss per common share/unit, basic and diluted(1)	$ (25.45)	$ (15.08)	$ (6.51)
Weighted average common shares/units outstanding, basic and diluted	9,422,799	1,897,544	1,897,544

(1) See Note 13 to our financial statements appearing elsewhere in this Annual Report on Form 10-K for further details on the calculation of basic and diluted net loss per share/unit attributable to common stockholders and common unitholders.

	As of December 31,		
	2018	2017	2016
		(in thousands)	
Balance Sheet Data:			
Cash and cash equivalents	$ 3,190	$ 30,912	$ 5,089
Marketable securities	184,638	8,259	30,469
Working capital(1)	172,698	47,674	27,248
Total assets	199,282	66,848	37,937
Long-term debt-net of current portion	2,000	151	313
Common stock/units	31	6	6
Preferred units	—	61,480	56,910
Additional paid-in capital	439,118	—	—
Accumulated deficit	(302,265)	(62,417)	(33,798)
Total stockholders'/members' equity (deficit)	136,667	(61,235)	(32,879)

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

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations.

You should read the following discussion and analysis of financial condition and operating results together with the section titled "Selected Financial Data" and our consolidated financial statements and the related notes appearing elsewhere in this Annual Report on Form 10-K. This discussion contains forward-looking statements that involve risks and uncertainties. As a result of many factors, such as those set forth in the section titled "Risk Factors" and elsewhere in this Annual Report on Form 10-K, our actual results may differ materially from those anticipated in or implied by these forward-looking statements. For convenience of presentation some of the numbers have been rounded in the text below.

Overview

We are a biopharmaceutical company dedicated to improving the lives of patients suffering from debilitating and life-threatening diseases through the discovery, development and commercialization of therapies to degrade disease-causing proteins. We use our proprietary technology platform to engineer proteolysis targeting chimeras, or PROTAC targeted protein degraders, that are designed to harness the body's own natural protein disposal system to selectively and efficiently degrade and remove disease-causing proteins. We believe that our targeted protein degradation approach is a new therapeutic modality that may provide distinct advantages over existing modalities, including traditional small molecule therapies and gene-based medicines. Our small molecule PROTAC technology has the potential to address a broad range of intracellular disease targets, including those representing the up to 80% of proteins that cannot be addressed by existing small molecule therapies, commonly referred to as undruggable targets. We are using our PROTAC platform to build an extensive pipeline of protein degradation product candidates to target diseases in a wide range of organ systems and tissues. We are advancing our lead product candidates, ARV-110 and ARV-471, into Phase 1 clinical trials. In March 2019, we initiated a Phase 1 clinical trial for ARV-110 in men with metastatic castration-resistant prostate cancer, or mCRPC, and we expect to initiate a Phase 1 clinical trial for ARV-471 in women with locally advanced or metastatic ER positive / HER2 negative breast cancer in the third quarter of 2019.

Our two lead product candidates are ARV-110 and ARV-471. We are developing ARV-110, a PROTAC targeted protein degrader targeting the androgen receptor protein, or AR, for the treatment of men with mCRPC. In March 2019, we initiated a Phase 1 trial and we expect to receive preliminary clinical data in the second half of 2019. We are developing ARV-471, a PROTAC targeted protein degrader targeting the estrogen receptor protein, or ER, for the treatment of women with locally advanced or metastatic ER positive / HER2 negative breast cancer. We expect to submit an investigational new drug, or IND, application to the U.S. Food and Drug Administration, or FDA, for ARV-471 in the second quarter of 2019, initiate a Phase 1 trial in the third quarter of 2019 and receive preliminary clinical data in 2020.

We commenced operations in 2013, and our operations to date have been limited to organizing and staffing our company, business planning, raising capital, conducting discovery and research activities, filing patent applications, identifying potential product candidates, undertaking preclinical studies and establishing arrangements with third parties for the manufacture of initial quantities of our product candidates. To date, we have not generated any revenue from product sales and have financed our operations primarily through sales of our equity interests, proceeds from our collaborations, grant funding and debt financing. Through December 31, 2018, we raised approximately $235.1 million in gross proceeds from the sale of common stock, and series A, series B and series C convertible preferred units, and had received an aggregate of $89.2 million in payments from collaboration partners, grant funding and loans from the State of Connecticut.

We are a development stage company and our lead product candidates and our research initiatives are at a preclinical stage of development. Our ability to generate revenue from product sales sufficient to achieve profitability will depend heavily on the successful development and eventual commercialization of one or more of our product candidates. Since inception, we have incurred significant operating losses. We expect to continue to incur significant expenses and increasing operating losses for at least the next several years. Our net loss was $41.5 million for the year ended December 31, 2018 and $24.0 million for the year ended December 31, 2017. As of December 31, 2018, we had an accumulated deficit of $302.3 million.

Our total operating expenses were $58.1 million for the year ended December 31, 2018 and $32.3 million for the year ended December 31, 2017. We anticipate that our expenses will increase substantially due to costs associated with our preclinical activities for our lead product candidates and the advancement of these candidates into Phase 1 clinical trials in the United States, which we initiated in the first quarter of 2019 for ARV-110 and expect to initiate in the third quarter of 2019 for ARV-471, development activities associated with our other product candidates, research activities in oncology, neurological and other disease areas to expand our pipeline, hiring additional personnel in research, clinical trials, quality and other functional areas, increased expenses incurred with contract manufacturing organizations, or CMOs, to supply us with product for our preclinical and clinical studies, as well as other associated costs including the management of our intellectual property portfolio.

We do not expect to generate revenue from sales of any product for many years, if ever. Accordingly, we will need to obtain substantial additional funding in connection with our continuing operations. If we are unable to raise capital when needed or on attractive terms, we could be forced to delay, reduce or eliminate our research or product development programs or any future commercialization efforts, or to relinquish valuable rights to our technologies, future revenue streams, research programs or product candidates or grant licenses on terms that may not be favorable to us.

Financial Operations Overview

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 foreseeable future. Our revenues to date have been generated through research collaboration and license agreements. Revenue is recognized ratably over our expected performance period under each agreement. We expect that our revenue for the next several years will be derived primarily from our current collaboration agreements and any additional collaborations that we may enter into in the future. To date, we have not received any royalties under any of the collaboration agreements.

Genentech License Agreement

In September 2015, we entered into an Option and License Agreement with Genentech, Inc. and F. Hoffmann-La Roche Ltd, collectively referred to as Genentech, focused on PROTAC targeted protein degrader discovery and research for target proteins, or Targets, based on our proprietary platform technology, other than excluded Targets as described below. This collaboration was expanded in November 2017 through an Amended and Restated Option, License and Collaboration Agreement, which we refer to as the Restated Genentech Agreement.

Under the Restated Genentech Agreement, Genentech has the right to designate up to ten Targets for further discovery and research utilizing our PROTAC platform technology. Genentech may designate as a Target any protein to which a PROTAC targeted protein degrader, by design, binds to achieve its mechanism of action, subject to certain exclusions. Genentech also has the right to remove a Target from the collaboration and substitute a different Target that is not an excluded Target at any time prior to us commencing research on such Target or in certain circumstances following commencement of research by us.

At the time we entered into the original agreement with Genentech we received an upfront payment of $11.0 million, and at the time we entered into the Restated Genentech Agreement, we also received an additional $34.5 million in upfront payments and expansion target payments. We are eligible to receive up to an aggregate of $27.5 million in additional expansion target payments if Genentech exercises its options for all remaining Targets. We are also eligible to receive payments aggregating up to $44.0 million per Target upon the achievement of specified development milestones; payments aggregating up to $52.5 million per Target (assuming approval of two indications) subject to the achievement of specified regulatory milestones; and payments aggregating up to $60.0 million per PROTAC targeted protein degrader directed against the applicable Target, subject to the achievement of specified sales milestones. These milestone payments are subject to reduction if we do not have a valid patent claim covering the licensed PROTAC targeted protein degrader at the time the milestone is achieved. We are also eligible to receive, on net sales of licensed PROTAC targeted protein degraders, mid-single digit royalties, which may be subject to reductions.

Pfizer License Agreement

In December 2017, we entered into a Research Collaboration and License Agreement with Pfizer, Inc., or Pfizer, setting forth our collaboration to identify or optimize PROTAC targeted protein degraders that mediate for degradation of Targets using our proprietary platform technology that are identified in the agreement or subsequently selected by Pfizer, subject to certain exclusions. We refer to this agreement as the Pfizer Collaboration Agreement.

Under the Pfizer Collaboration Agreement, Pfizer has designated a number of initial Targets. For each identified Target, we and Pfizer will conduct a separate research program pursuant to a research plan. Pfizer may make substitutions for any of the initial Target candidates, subject to the stage of research for such Target.

In the year ended December 31, 2018, we received an aggregate of $28.0 million in upfront payments and certain additional payments under the terms of the Pfizer Collaboration Agreement. We are also eligible to receive up to an additional $37.5 million in non-refundable option payments if Pfizer exercises its options for all Targets under the agreement. Pfizer exercised an option for $2.5 million in December 2018 and the amount is included in accounts receivable at December 31, 2018. We are also entitled to receive up to $225.0 million in development milestone payments and up to $550.0 million in sales-based milestone payments for all designated Targets under the agreement, as well as mid- to high-single digit tiered royalties based on sales of PROTAC targeted protein degrader-related products, which may be subject to reductions.

Prior License Agreement

In April 2015, we entered into a collaboration agreement with Merck Sharp & Dohme Corp. We received an upfront non-refundable payment of $7.0 million, which was recognized as revenue over the total estimated period of performance. The agreement expired in April 2018.

Operating Expenses

Our operating expenses since inception have consisted solely of research and development costs and general and administrative costs.

Research and Development Expenses

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

- salaries, benefits and other related costs, including stock-based compensation expense, for personnel engaged in research and development functions;
- expenses incurred under agreements with third parties, including contract research organizations and other third parties that conduct research and preclinical activities on our behalf as well as third parties that manufacture our product candidates for use in our preclinical and potential future clinical trials;
- costs of outside consultants, including their fees, equity-based compensation and related travel expenses;
- the costs of laboratory supplies and acquiring, developing preclinical studies and clinical trial materials;
- facility-related expenses, which include direct depreciation costs of equipment and allocated expenses for rent and maintenance of facilities and other operating costs; and
- third-party licensing fees.

We expense research and development costs as incurred.

We typically use our employee and infrastructure resources across our development programs, and as such, do not track our internal research and development expenses on a program-by-program basis. We track outsourced development costs and certain personnel costs by product candidate. Other internal costs are not allocated.

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

	Year Ended December 31,	
(in thousands)	**2018**	**2017**
AR program development costs	$ 11,298	$ 9,837
ER program development costs	4,240	6,660
Other research and development costs	29,656	12,296
Total research and development costs	$ 45,194	$ 28,793

Research and development activities are central to our business model. We expect that our research and development expenses will continue to increase substantially for the foreseeable future as we continue to advance ARV-110 and ARV-471 into clinical trials, including our Phase 1 clinical trials, and continue to discover and develop additional product candidates.

We cannot reasonably estimate or determine with certainty the duration and costs of future clinical trials of ARV-110 and ARV-471 or any other product candidate we may develop or if, when, or to what extent we will generate revenue from the commercialization and sale of any product candidate for which we obtain marketing approval. We may never succeed in obtaining marketing approval for any product candidate. The successful development and commercialization of our product candidates is highly uncertain. This is due to the numerous risks and uncertainties associated with developing drugs, including the uncertainty of:

- successful completion of preclinical studies;
- successful initiation of clinical trials;
- successful patient enrollment in and completion of clinical trials;
- receipt and related terms of marketing approvals from applicable regulatory authorities;
- obtaining and maintaining patent and trade secret protection and regulatory exclusivity for our product candidates;
- making arrangements with third-party manufacturers, or establishing manufacturing capabilities, for both clinical and commercial supplies of our product candidates;
- establishing sales, marketing and distribution capabilities and launching commercial sales of our products, if and when approved, whether alone or in collaboration with others;
- acceptance of our products, if and when approved, by patients, the medical community and third-party payors;
- obtaining and maintaining third-party coverage and adequate reimbursement;
- maintaining a continued acceptable safety profile of the products following approval; and
- effectively competing with other therapies.

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

General and Administrative Expenses

General and administrative expenses consist primarily of salaries and other related costs, including stock-based compensation, for personnel in our executive, finance, business development and administrative functions. General and administrative expenses also include legal fees relating to intellectual property and corporate matters; professional fees for accounting, auditing, tax and consulting services; insurance costs; travel expenses; and facility-related expenses, which include direct depreciation costs and allocated expenses for rent and maintenance of facilities and other operating costs.

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

Interest Income (Expense)

Interest income consists of interest earned on our cash, cash equivalents and short-term investments. Interest income increased in 2018 as we invested our excess cash from the proceeds of our initial public offering and series C financing, and the payments received under the collaboration agreements. Our interest income had decreased due to lower investment balances as we proceeded through 2017. Interest expense consists of interest paid or accrued on our outstanding debt. Interest expense was approximately $57,000 in 2018 and we expect that it will increase in 2019 with the additional interest payment on the State of Connecticut partially forgivable loan borrowed in September 2018.

Income Taxes

Since our inception in 2013, we have not recorded any U.S. federal or state income tax benefits for the net losses we have incurred in any year or for our federal earned research and development tax credits, due to our uncertainty of realizing a benefit from those items. As of December 31, 2018, we had federal net operating loss carryforwards of $58.3 million, which begin to expire in 2033. As of December 31, 2018, we also had federal and state research and development tax credit carryforwards of $2.7 million and $2.2 million, respectively, which begin to expire in 2033 and 2028, respectively.

As of December 31, 2018, Arvinas, Inc. had five wholly owned subsidiaries organized as C-corporations: Arvinas Operations, Inc., Arvinas Androgen Receptor, Inc., Arvinas Estrogen Receptor, Inc., Arvinas BRD4, Inc. and Arvinas Winchester, Inc. Prior to December 31, 2018, these subsidiaries were separate filers for federal tax purposes. Net operating loss carryforwards are generated from the C-corporation subsidiaries' filings. We have provided a valuation allowance against the full amount of the deferred tax assets since, in the opinion of management, based upon our earnings history, it is more likely than not that the benefits will not be realized.

In December 2017, the United States enacted the Tax Cuts and Jobs Act, or the Act. The Act significantly changes U.S. corporate income tax laws by, among other provisions, reducing the maximum U.S. corporate income tax rate from 35% to 21% starting in 2018. During the year ended December 31, 2017, we reduced our deferred income tax asset by approximately $7.2 million as a result of the re-measurement of deferred tax assets and liabilities to the new lower statutory rate of 21%. The rate change did not result in an income tax expense as the change was offset by the change in the valuation allowance.

Critical Accounting Policies and Use of Estimates

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

While our significant accounting policies are described in more detail in the notes to our consolidated financial statements appearing elsewhere in this Annual Report on Form 10-K, we believe that the following accounting policies are those most critical to the judgments and estimates used in the preparation of our consolidated financial statements.

Revenue Recognition

As discussed in Note 2 to our consolidated audited financial statements, we adopted Accounting Standards Codification (ASC) 606, ***Revenue from Contracts with Customers*** as of January 1, 2017 using the full retrospective method.

Our revenue is generated through research collaboration and license agreements with pharmaceutical partners. The terms of these agreements contain multiple goods and services which may include (i) licenses, (ii) research and development activities and (iii) participation in joint research and development steering committees. The terms of these agreements may include non-refundable upfront license or option fees, payments for research and development activities, payments upon the achievement of certain milestones, and royalty payments based on product sales derived from the collaboration. Under ASC 606, we evaluate whether the license agreement, research and development services, and participation in research and development steering committees, represent separate or combined performance obligations. We have determined that these services within our existing contracts represent a combined single performance obligation.

The research collaboration and license agreements typically include contingent milestone payments related to specified preclinical and clinical development milestones and regulatory milestones. These milestone payments represent variable consideration that are not initially recognized within the transaction price as they are fully constrained under the guidance in ASC 606. We will continue to assess the probability of significant reversals for any amounts that become likely to be realized prior to recognizing the variable consideration associated with these payments within the transaction price.

Revenue is recognized ratably over our expected performance period under each respective arrangement. We make our best estimate of the period over which we expect to fulfill our performance obligations, which includes access to technology through the license agreement and research activities. Given the uncertainties of these collaboration arrangements, significant judgement is required to determine the duration of the performance period.

For the years ended December 31, 2018 and 2017, transaction price allocated to the combined performance obligation identified under the agreements was recognized as revenue on a straight-line basis over the estimated performance period under each respective arrangement. Straight-line basis was considered the best measure of progress in which control of the combined obligation transfers to the customers, due to the contract containing license rights to technology, research and development services, and joint committee participation, which in totality are expected to occur ratably over the performance period.

Our contracts may also call for certain sales-based milestone and royalty payments upon successful commercialization of a target. In accordance with ASC 606-10-55-65, we recognize revenues from sales-based milestone and royalty payments at the later of (i) the occurrence of the subsequent sale; or (ii) the performance obligation to which some or all of the sales-based milestone or royalty payments has been allocated has been satisfied (or partially satisfied). We anticipate recognizing these milestone and royalty payments if and when subsequent sales are generated by the customer from the use of the technology. To date, no revenue from these sales-based milestone and royalty payments has been recognized for any periods.

Amounts received prior to satisfying the above revenue recognition criteria are recorded as a contract liability in our accompanying consolidated balance sheets.

Incentive Units

Prior to our initial public offering, we issued equity-based compensation awards to employees and non-employees through the granting of incentive units. We had periodically granted incentive units to employees and non-employees, which generally vested over a four-year period. The incentive units represented a separate substantive class of equity with defined rights within the limited liability company agreement of Arvinas Holding Company, LLC, or the LLC Operating Agreement. The incentive units represented profit interest in the increase in the value of the entity over a participation threshold, as determined at the time of grant. The holder, therefore, had the right to participate in distributions of profits only in excess of such participation threshold. The participation threshold was based on the valuation of the incentive unit on or around the grant date.

We accounted for unit-based compensation in accordance with ASC 718, *Compensation-Stock Compensation* (ASC 718). In accordance with ASC 718, compensation cost is measured at estimated fair value and is included as compensation expense over the vesting period during which an employee provides service in exchange for the award.

We used a Black-Scholes option pricing model to determine the fair value of our incentive units, due to the existence of a participation threshold. The Black-Scholes option pricing model includes various assumptions, including the expected life of incentive units, the expected volatility and the expected risk-free interest rate. The fair value of the underlying common units represented the exercise price utilized in the Black-Scholes option pricing model. These assumptions reflected our best estimates, but they involved inherent uncertainties based on market conditions generally outside our control. As a result, if other assumptions had been used, unit-based compensation cost could have been materially impacted. Furthermore, if we used different assumptions for future grants, unit-based compensation cost could have been materially impacted in future periods.

As there had been no public market for our common units prior to our initial public offering, the estimated fair value of our common units had been determined by our board of directors as of the date of each incentive unit grant, with input from management, considering our most recently available third-party valuations of common stock units. Valuations were updated when facts and circumstances indicated that the most recent valuation was no longer valid, such as changes in the stage of our development efforts, various exit strategies and their timing, and other scientific developments that could be related to the valuation of our company, or, at a minimum, annually. 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 unit valuations in 2017 and January 2018 were prepared using a market approach, specifically the subject company transaction method. The subject company transaction method solves for the total equity value which allocates a probability-weighted present value to the series B preferred unit holders consistent with the investment amount of that financing round adjusted to account for the impact of progress or changes in the business since the closing of the series B financing. Our common unit valuation as of June 30, 2018 was prepared using the income and market approaches simultaneously. Under the income approach, the hybrid method was used, which is a combination of the probability weighted expected return method, or PWERM, and the option pricing method, or OPM. Under the market approach, the subject company transaction method was used. Within both the PWERM and OPM, the subject company transaction method was used to solve for the total equity value which allocates a probability weighted present value to the series C preferred unit holders consistent with the investment amount of that financing round.

These third-party valuations resulted in participation thresholds of $127.1 million as of December 31, 2017, $270.8 million as of March 31, 2018 and $292.0 million as of June 30, 2018. Fair value estimates of underlying shares are no longer necessary to determine the fair value of new equity awards because the underlying shares are traded in the public market.

Immediately prior to the effectiveness of our registration statement on Form S-1 (File No. 333-227112), Arvinas Holding Company, LLC, or Arvinas LLC, our predecessor company, converted from a Delaware limited liability company into Arvinas, Inc., a Delaware corporation, which we refer to as the Conversion. In connection with the Conversion, incentive units in Arvinas LLC were exchanged for common stock and restricted common stock of Arvinas, Inc.

New Accounting Pronouncements

For information on new accounting standards, see Note 2 to our consolidated audited financial statements appearing elsewhere in this Annual Report on Form 10-K.

Results of Operations

Comparison of Years Ended December 31, 2018 and 2017

Revenues

Revenues for the year ended December 31, 2018 were $14.3 million, compared with $7.6 million for the year ended December 31, 2017. The increase in revenues of $6.7 million was due to an increase in license and rights to technology fees and research and development activities primarily related to the Pfizer Collaboration Agreement initiated in January 2018 and the Restated Genentech Agreement that was initiated in November 2017.

Research and Development Expenses

Research and development expenses for the year ended December 31, 2018 were $45.2 million, compared with $28.8 million for the year ended December 31, 2017. The increase of $16.4 million was primarily due to an increase in personnel and personnel costs utilized across all our programs of $9.8 million, including an increase in stock compensation expense of $6.0 million. Direct expenses related to our platform and exploratory targets increased $5.0 million as we expand the number of protein targets in the exploratory phase. Direct research expenses related to our androgen receptor, or AR, program increased by $2.8 million as we incurred a full-year of IND enabling activities in 2018. Direct research expenses related to our estrogen receptor, or ER, program decreased by $1.2 million due to the timing of IND enabling studies extending into 2019.

General and Administrative Expenses

General and administrative expenses were $12.9 million for the year ended December 31, 2018, compared with $3.5 million for the year ended December 31, 2017. The increase of $9.4 million was primarily due to an increase of $7.1 million in personnel related costs, including $5.4 million related to stock compensation expense. Increases in other costs, including legal and other professional fees of $1.3 million, corporate insurance of $0.3 million, and franchise taxes of $0.3 million are primarily related to public company costs incurred for the first time in 2018.

Other Income (Expenses)

Other income (expenses) was $2.3 million for the year ended December 31, 2018, compared with $0.7 million for the year ended December 31, 2017. The increase of $1.6 million was primarily related an increase in interest income of $2.2 million, partially offset by a reduction in refundable research and development credits of $0.4 million and an increase in the value of the preferred unit warrant of $0.2 million. The increase in interest income was the result of our higher average cash, cash equivalent and short-term investment balances for the year ended December 31, 2018 compared to the year ended December 31, 2017 and an increase in bond yields.

Liquidity and Capital Resources

Sources of Liquidity

We do not currently have any approved products and have never generated any revenue from product sales. To date, we have financed our operations primarily through the sale of equity interests and through payments from collaboration partners, grant funding and loans from the State of Connecticut. Through December 31, 2018, we raised approximately $235.1 million in gross proceeds from the sale of common stock, and series A, series B and series C convertible preferred units, and had received an aggregate of $89.2 million in payments from collaboration partners, grant funding and forgivable and partially forgivable loans from the State of Connecticut. In October 2018, we completed our IPO in which we issued and sold an aggregate of 7,700,482 shares of common stock, including 200,482 additional shares of common stock at a subsequent closing upon the exercise in part by the underwriters of their option to purchase additional shares at a public offering price of $16.00 per share, for aggregate gross proceeds of $123.2 million before fees and expenses.

Cash Flows

Our cash, cash equivalents and marketable securities totaled $187.8 million as of December 31, 2018 and $39.2 million as of December 31, 2017. We had an outstanding loan balance of $2.2 million as of December 31, 2018 and $0.3 million as of December 31, 2017.

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

	Year Ended December 31,	
(in thousands)	**2018**	**2017**
Net cash provided by (used in) operating activities	$ (16,118)	$ 5,113
Net cash provided by (used in) investing activities	(179,665)	20,872
Net cash provided by (used in) financing activities	168,061	(161)
Increase (decrease) in cash and cash equivalents	$ (27,722)	$ 25,824

Operating Activities

Net cash used in operating activities for the year ended December 31, 2018 was $16.1 million, resulting from our net loss of $41.5 million and a reduction in our deferred revenue of $8.5 million, partially offset by non-cash expenses of $12.8 million and a decrease in accounts receivable of $22.2 million. The reduction in deferred revenue is primarily due to $14.3 million of revenue recognized, partially offset by $5.8 million in target payments received from a collaboration partner.

Net cash provided by operating activities for the year ended December 31, 2017 was $5.1 million, consisting of an increase of $51.9 million in deferred revenue, a net increase of $0.9 million in accrued expenses and accounts payable, and non-cash charges of $0.9 million, partially offset by our net loss of $24.0 million and an increase in account and other receivables of $24.6 million. The increase in deferred revenue was due to $34.5 million in up-front payments received from a collaboration partner and a $25.0 million up-front payment from a collaboration partner included in account receivable, reduced by $7.6 million of recognized deferred revenue. Our non-cash charges totaling $0.9 million included depreciation, unit-based compensation expense, and accretion on short-term investments.

Investing Activities

Net cash used in investing activities for the year ended December 31, 2018 was $179.7 million, attributable to the net investment of excess cash of $176.8 million and the purchases of property and equipment of $2.8 million.

Net cash provided by investing activities for the year ended December 31, 2017 was $20.9 million, attributable to the maturities and sales of marketable securities of $25.1 million, partially offset by the purchase of new marketable securities of $3.2 million and the purchases of property and equipment of $1.0 million.

Financing Activities

Net cash provided by financing activities for the year ended December 31, 2018 was $168.1 million, primarily attributable to the net proceeds from the sale of series C preferred units of $55.0 million and the sale of common stock, net of underwriter discounts and offering costs, of $111.2 million. We also received loan proceeds of $2.0 million and made $0.2 million in debt payments.

Net cash used in financing activities for the year ended December 31, 2017 was $0.2 million for payments on our long-term debt.

Funding Requirements

Since our inception, we have incurred significant operating losses. We expect to continue to incur significant expenses and increasing operating losses for the foreseeable future as we advance the preclinical and clinical development of our product candidates. In addition, we expect to continue to incur additional costs associated with operating as a public company.

Specifically, we anticipate that our expenses will increase substantially if and as we:

- conduct a Phase 1 clinical trial of our product candidate, ARV-110, in men with mCRPC;
- initiate a planned Phase 1 clinical trial of our product candidate, ARV-471, in women with locally advanced or metastatic ER positive / HER2 negative breast cancer;
- apply our PROTAC platform to advance additional product candidates into preclinical and clinical development;
- expand the capabilities of our PROTAC platform;
- seek marketing approvals for any product candidates that successfully complete clinical trials;
- ultimately establish a sales, marketing and distribution infrastructure and scale up external manufacturing capabilities to commercialize any products for which we may obtain marketing approval;
- expand, maintain and protect our intellectual property portfolio;

- hire additional clinical, regulatory and scientific personnel; and
- add operational, financial and management information systems and personnel to support our research, product development and future commercialization efforts and support our operations as a public company.

As of December 31, 2018, we believe that our existing cash, cash equivalents and marketable securities, will enable us to fund our operating expenses and capital expenditure requirements for at least the next 24 months. We have based this estimate on assumptions that may prove to be wrong, and we could use our capital resources sooner than we currently expect. Our future capital requirements will depend on many factors, including:

- the progress, costs and results of our Phase 1 clinical trial for ARV-110 and our planned Phase 1 clinical trial for ARV-471 and any future clinical development of ARV-110 and ARV-471;
- the scope, progress, costs and results of preclinical and clinical development for our other product candidates and development programs;
- the number and development requirements of other product candidates that we pursue, including our neurodegenerative research programs;
- the success of our collaborations with Pfizer and Genentech;
- the costs, timing and outcome of regulatory review of our product candidates;
- the costs and timing of future commercialization activities, including product manufacturing, marketing, sales and distribution, for any of our product candidates for which we receive marketing approval;
- the revenue, if any, received from commercial sales of our product candidates for which we receive marketing approval;
- the costs and timing of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property rights and defending any intellectual property-related claims; and
- our ability to establish collaboration arrangements with other biotechnology or pharmaceutical companies on favorable terms, if at all, for the development or commercialization of our product candidates.

As a result of these anticipated expenditures, we will need to obtain substantial additional financing in connection with our continuing operations. Until such time, if ever, as we can generate substantial revenue from product sales, we expect to finance our cash needs through a combination of equity offerings, debt financings, collaborations, strategic alliances and marketing, distribution or licensing arrangements. Although we may receive potential future payments under our collaborations with Pfizer and Genentech, we do not currently have any committed external source of funds. Adequate additional funds may not be available to us on acceptable terms, or at all. If we are unable to raise capital when needed or on attractive terms, we may be required to delay, limit, reduce or terminate our research, product development programs or any future commercialization efforts or grant rights to develop and market product candidates that we would otherwise prefer to develop and market ourselves.

To the extent that we raise additional capital through the sale of equity or convertible debt securities, the terms of these securities may include liquidation or other preferences that adversely affect the rights of our common stockholders. 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 product candidates or grant licenses on terms that may not be favorable to us.

Borrowings

In August 2013, we entered into a Loan Agreement, or Loan, with Connecticut Innovations, Incorporated, or CII, the strategic venture capital arm and a component unit of the State of Connecticut. Under the Loan, we borrowed $750,000 for the purchase of laboratory equipment, information technology equipment and leasehold improvements. Interest on the Loan is compounded on a monthly basis at a rate of 7.50% per annum. The Loan provided for monthly, interest-only payments for ten months. Beginning on June 1, 2015 we were required to make monthly principal and interest payments through July 31, 2019. We can prepay the amount due at any time without premium or penalty. The

Loan is secured by substantially all of our assets. The amount outstanding under the Loan was $0.2 million as of December 31, 2018 and $0.3 million as of December 31, 2017. In connection with the issuance of the Loan, we granted CII a warrant to purchase 110,116 of our series A preferred units at a purchase price of $0.6811 per unit, with a seven-year term from the date of issuance. The warrant was exercised in July 2018.

In January 2014, we entered into an Assistance Agreement with the State of Connecticut, or the 2014 Assistance Agreement. Under the terms of the 2014 Assistance Agreement, we borrowed $2.5 million. Borrowings under the 2014 Assistance Agreement were forgivable if we maintained a minimum number of full-time jobs in the State of Connecticut for a minimum period at a minimum annual salary. Effective in March 2016, the full principal amount under the 2014 Assistance Agreement had been forgiven. While borrowings under the 2014 Assistance Agreement have been forgiven, we remain subject to an ongoing covenant to be located in the State of Connecticut through January 2024. Upon violation of this covenant we would be required to repay the full original funding amount of $2.5 million plus liquidated damages of 7.50%.

In June 2018, we entered into an additional Assistance Agreement with the State of Connecticut, or the 2018 Assistance Agreement, to provide funding for the expansion and renovation of laboratory and office space. Under the terms of the 2018 Assistance Agreement, we could borrow from the State of Connecticut a maximum of $2.0 million, provided that the funding does not exceed more than 50% of the total costs of the expansion and renovation. Borrowings under the 2018 Assistance Agreement bear an interest rate of 3.25% per annum and interest payments are required for the first 60 months from the funding date. Interest expense related to the Assistance Agreement is expected to be $65,000 annually for the first five years. Thereafter, the loan begins to fully amortize through month 120, maturing in June 2028. Up to $1.0 million of the funding can be forgiven if we meet certain employment conditions. We may be required to prepay a portion of the loan if the employment conditions are not met. The 2018 Assistance Agreement requires that we be located in the State of Connecticut through June 2028 with a default penalty of repayment of the full original funding amount of $2.0 million plus liquidated damages of 7.5% of the total amount of funding received. We borrowed the full $2.0 million under the 2018 Assistance Agreement in September 2018 and the full amount remains outstanding at December 31, 2018.

Off-Balance Sheet Arrangements

We have not entered into any off-balance sheet arrangements and do not have any holdings in variable interest entities.

Emerging Growth Company Status

As an “emerging growth company,” the Jumpstart Our Business Startups Act of 2012 allows us to delay adoption of new or revised accounting standards applicable to public companies until such standards are made applicable to private companies. However, we have irrevocably elected not to avail ourselves of this extended transition period for complying with new or revised accounting standards and, therefore, we will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk.

We are exposed to market risks in the ordinary course of our business. These risks primarily include interest rate sensitivities. Our interest-earning assets consist of cash, cash equivalents, and marketable securities. Interest income earned on these assets was $2.5 million in 2018 and $0.2 million in 2017. Our interest income is sensitive to changes in the general level of interest rates, primarily U.S. interest rates. At December 31, 2018, our cash equivalents consisted of bank deposits and money market funds, and our marketable securities included interest-earning securities. Such interest-earning instruments carry a degree of interest rate risk. Our outstanding debt was $2.2 million as of December 31, 2018 and $0.3 million as of December 31, 2017. Our outstanding debt carries a fixed interest rate of 3.25% per annum on $2.0 million of the outstanding debt and 7.50% per annum on the remaining outstanding debt.

Item 8. Financial Statements and Supplementary Data.

Our financial statements, together with the report of our independent registered public accounting firm, appear on pages F-1 through F-24 of this Annual Report on Form 10-K.

Item 9. Changes in and Disagreements With Accountants on Accounting and Financial Disclosure.

None.

Item 9A. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer (our principal executive officer and principal financial officer, respectively), evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2018. The term "disclosure controls and procedures," as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended, or the Exchange Act, means controls and other procedures of a company that are designed to ensure that information required to be disclosed by the company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the Securities and Exchange Commission's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company's management, including its principal executive and principal financial officers, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure. Our management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and our management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on the evaluation of our disclosure controls and procedures as of December 31, 2018, our Chief Executive Officer and Chief Financial Officer concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level.

Management's annual report on internal control over financial reporting

This Annual Report on Form 10-K does not include a report of management's assessment regarding internal control over financial reporting or an attestation report of our independent registered public accounting firm due to a transition period established by rules of the SEC for newly public companies.

Changes in internal control over financial reporting

No change in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) occurred during the fiscal quarter ended December 31, 2018 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information.

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

The information required by this Item is incorporated by reference from the information that will be contained in our Proxy Statement for our 2019 Annual Meeting of Stockholders, which we intend to file with the SEC within 120 days of the end of the fiscal year to which this Annual Report on Form 10-K relates pursuant to General Instruction G(3) of Form 10-K.

We have adopted a Code of Business Conduct and Ethics that applies to our officers, including our principal executive, financial and accounting officers, and our directors and employees. We have posted the text of our Code of Business Conduct and Ethics under the "Investors & Media – Corporate Governance" section of our website, www.arvinas.com. We intend to disclose on our website any amendments to, or waivers from, the Code of Business Conduct and Ethics that are required to be disclosed pursuant to the disclosure requirements of Item 5.05 of Form 8-K.

Item 11. Executive Compensation.

The information required by this Item is incorporated by reference from the information that will be contained in our Proxy Statement for our 2019 Annual Meeting of Stockholders, which we intend to file with the SEC within 120 days of the end of the fiscal year to which this Annual Report on Form 10-K relates pursuant to General Instruction G(3) of Form 10-K.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

The information required by this Item is incorporated by reference from the information that will be contained in our Proxy Statement for our 2019 Annual Meeting of Stockholders, which we intend to file with the SEC within 120 days of the end of the fiscal year to which this Annual Report on Form 10-K relates pursuant to General Instruction G(3) of Form 10-K.

Item 13. Certain Relationships and Related Transactions, and Director Independence.

The information required by this Item is incorporated by reference from the information that will be contained in our Proxy Statement for our 2019 Annual Meeting of Stockholders, which we intend to file with the SEC within 120 days of the end of the fiscal year to which this Annual Report on Form 10-K relates pursuant to General Instruction G(3) of Form 10-K.

Item 14. Principal Accounting Fees and Services.

The information required by this Item is incorporated by reference from the information that will be contained in our Proxy Statement for our 2019 Annual Meeting of Stockholders, which we intend to file with the SEC within 120 days of the end of the fiscal year to which this Annual Report on Form 10-K relates pursuant to General Instruction G(3) of Form 10-K.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

(1) Financial Statements—The following financial statements are filed as part of this Annual Report on Form 10-K:

(2) Financial Statement Schedules

All financial statement schedules have been omitted because they are not applicable, not required or the information required is shown in the financial statements or the notes thereto.

(3) Index to Exhibits

The following is a list of exhibits filed as part of this Annual Report on Form 10-K.

Exhibit Number	Description
3.1	Restated Certificate of Incorporation of the Registrant (incorporated by reference to Exhibit 3.1 to the Registrant's Current Report on Form 8-K (File No. 001-38672) filed with the SEC on October 1, 2018).
3.2	Amended and Restated Bylaws of the Registrant (incorporated by reference to Exhibit 3.2 to the Registrant's Current Report on Form 8-K (File No. 001-38672) filed with the SEC on October 1, 2018).
4.1	Specimen Stock Certificate evidencing the shares of common stock (incorporated by reference to Exhibit 4.1 to the Registrant's Registration Statement on Form S-1 (File No. 333-227112) filed with the SEC on August 30, 2018).
4.2*	Registration Rights Agreement among the Registrant and the other parties thereto, dated September 26, 2018.
4.3	Second Amended and Restated Put Agreement among the Registrant, Connecticut Innovations, Incorporated and the other parties thereto, dated March 29 2018 (incorporated by reference to Exhibit 4.3 to the Registrant's Registration Statement on Form S-1 (File No. 333-2271121) filed with the SEC on August 30. 2018).
10.1+	Incentive Share Plan, as amended by First Amendment, dated October 16, 2015, Second Amendment, dated December 22, 2016, Third Amendment, dated September 8, 2017, and Fourth Amendment, dated March 29, 2018 (incorporated by reference to Exhibit 10.1 to the Registrant's Registration Statement on Form S-1 (File No. 333-227112) filed with the SEC on August 30, 2018).
10.2+	Form of Incentive Share Award Agreement under Incentive Share Plan (incorporated by reference to Exhibit 10.2 to the Registrant's Registration Statement on Form S-1 (File No. 333-227112) filed with the SEC on August 30, 2018).
10.3+	Form of Restricted Stock Agreement under Incentive Share Plan (incorporated by reference to Exhibit 10.3 to the Registrant's Registration Statement on Form S-1/A (File No. 333-227112) filed with the SEC on September 14, 2018).
10.4+	2018 Stock Incentive Plan (incorporated by reference to Exhibit 10.4 to the Registrant's Registration Statement on Form S-1/A (File No. 333-227112) filed with the SEC on September 14, 2018).

10.5+	Form of Stock Option Agreement under 2018 Stock Incentive Plan (incorporated by reference to Exhibit 10.5 to the Registrant's Registration Statement on Form S-1/A (File No. 333-227112) filed with the SEC on September 14, 2018).
10.6*+	Form of Restricted Stock Unit Agreement under 2018 Stock Incentive Plan.
10.7+	2018 Employee Stock Purchase Plan (incorporated by reference to Exhibit 10.6 to the Registrant's Registration Statement on Form S-1/A (File No. 333-227112) filed with the SEC on September 14, 2018).
10.8+	Form of Director and Officer Indemnification Agreement (incorporated by reference to Exhibit 10.7 to the Registrant's Registration Statement on Form S-1/A (File No. 333-227112) filed with the SEC on September 14, 2018).
10.9+	Employment Agreement between the Registrant and John Houston, Ph.D., dated September 13, 2018 (incorporated by reference to Exhibit 10.8 to the Registrant's Registration Statement on Form S-1/A (File No. 333-227112) filed with the SEC on September 14, 2018).
10.10+	Employment Agreement between the Registrant and Sean Cassidy, dated August 28, 2018 (incorporated by reference to Exhibit 10.9 to the Registrant's Registration Statement on Form S-1/A (File No. 333-227112) filed with the SEC on September 14, 2018).
10.11+	Employment Agreement between the Registrant and Ian Taylor, Ph.D., dated August 28, 2018 (incorporated by reference to Exhibit 10.10 to the Registrant's Registration Statement on Form S-1/A (File No. 333-227112) filed with the SEC on September 14, 2018).
10.12+	Employment Agreement between the Registrant and Andrew Crew, Ph.D., dated August 28, 2018 (incorporated by reference to Exhibit 10.11 to the Registrant's Registration Statement on Form S-1/A (File No. 333-227112) filed with the SEC on September 14, 2018).
10.13	Lease Agreement between the Arvinas Operations, Inc. (formerly Arvinas, Inc.) and Science Park Development Corporation, dated December 31, 2017, as amended by First Amendment to Lease, dated May 23, 2018, and second Amendment to Lease, dated September 4, 2018 (incorporated by reference to Exhibit 10.12 to the Registrant's Registration Statement on Form S-1/A (File No. 333-227112) filed with the SEC on September 14, 2018).
10.14	Third Amendment to Lease between Arvinas Operations, Inc. (formerly Arvinas, Inc.) and Science Park Development Corporation, dated March 12, 2019 (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K (File No. 001-38672) filed with the SEC on March 15, 2019).
10.15†	License Agreement between Yale University and Arvinas Operations, Inc. (formerly Arvinas, Inc.), dated July 5, 2013, as amended by Amendment No. 1, dated May 8, 2014, Amendment No. 2, dated October 23, 2014, and Letter Amendment Number 3, dated April 1, 2015 (incorporated by reference to Exhibit 10.13 to the Registrant's Registration Statement on Form S-1/A (File No. 333-227112) filed with the SEC on September 14, 2018).
10.16*††	Amendment No. 4 to License Agreement between Yale University and Arvinas Operations, Inc. (formerly Arvinas, Inc.) dated January 9, 2019.
10.17	Amended and Restated Consulting Agreement between Craig Crews and Arvinas Operations, Inc. (formerly Arvinas, Inc.), dated October 16, 2015, as amended by Amendment No. 1, dated August 27, 2018 (incorporated by reference to Exhibit 10.14 to the Registrant's Registration Statement on Form S-1 (File No. 333-227112) filed with the SEC on August 30, 2018).
10.18†	Corporate Sponsored Research Agreement between Yale University and Arvnas Operations, Inc. (formerly Arvinas, Inc.), dated July 1, 2016, as amended by Amendment No. 1, dated April 1, 2018 (incorporated by reference to Exhibit 10.15 to the Registrant's Registration Statement on Form S-1 (File No. 333-227112) filed with the SEC on August 30, 2018).
10.19†	Amended and Restated License and Option Agreement among Genentech, Inc., F. Hoffmann-La Roche Ltd and Arvinas Operations, Inc. (formerly Arvinas, Inc.), dated November 8, 2017 (incorporated by reference to Exhibit 10.16 to the Registrant's Registration Statement on Form S-1/A (File No. 333-227112) filed with the SEC on September 14, 2018).

10.20†	Research Collaboration and License Agreement between Pfizer Inc. and Arvinas Operations, Inc. (formerly Arvinas, Inc.), dated December 22, 2017 (incorporated by reference to Exhibit 10.17 to the Registrant's Registration Statement on Form S-1/A (File No. 333-227112) filed with the SEC on September 14, 2018).
10.21†	Sponsored Research Agreement between The Silverstein Foundation for Parkinson's with GBA and Arvinas Operations, Inc. (formerly Arvinas, Inc.), dated March 7, 2018 (incorporated by reference to Exhibit 10.18 to the Registrant's Registration Statement on Form S-1/A (File No. 333-227112) filed with the SEC on September 14, 2018).
21.1*	Subsidiaries of the Registrant.
23.1*	Consent of Deloitte & Touche LLP, independent registered public accounting firm..
31.1*	Certification of Principal Executive Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2*	Certification of Principal Financial Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1**	Certification of Principal Executive Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
32.2**	Certification of Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS*	XBRL Instance Document
101.SCH*	XBRL Taxonomy Extension Schema Document
101.CAL*	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF*	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB*	XBRL Taxonomy Extension Label Linkbase Document
101.PRE*	XBRL Taxonomy Extension Presentation Linkbase Document

* Filed herewith.

** Furnished herewith.

† Confidential treatment granted as to portions of the exhibit. Confidential materials omitted and filed separately with the Securities and Exchange Commission.

†† Confidential treatment requested as to portions of the exhibit. Confidential materials omitted and filed separately with the Securities and Exchange Commission.

\+ Management contract or compensatory plan or arrangement filed in response to Item 15(a)(3) of the Instructions to the Annual Report on Form 10-K.

Item 16. Form 10-K Summary

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, as amended, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

ARVINAS, INC.

Date: March 26, 2019

By: /s/ John Houston, Ph.D.
John Houston, Ph.D.
President and Chief Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, as amended, this report has been signed below by the following persons on behalf of the registrant in the capacities and on the dates indicated.

Name	Title	Date
/s/ John Houston, Ph.D. John Houston, Ph.D.	President, Chief Executive Officer and Director (principal executive officer)	March 26, 2019
/s/ Sean Cassidy Sean Cassidy	Chief Financial Officer (principal financial and accounting officer)	March 26, 2019
/s/ Timothy Shannon, M.D. Timothy Shannon, M.D.	Chairman of the Board of Directors	March 26, 2019
/s/ Edward Kennedy, Jr. Edward Kennedy, Jr.	Director	March 26, 2019
/s/ Jakob Loven, Ph.D. Jakob Loven, Ph.D.	Director	March 26, 2019
/s/ Bradley Margus Bradley Margus	Director	March 26, 2019
/s/ Briggs Morrison, M.D. Briggs Morrison, M.D.	Director	March 26, 2019
/s/ Kush Parmar, M.D., Ph.D. Kush Parmar, M.D., Ph.D.	Director	March 26, 2019
/s/ Liam Ratcliffe, M.D., Ph.D. Liam Ratcliffe, M.D., Ph.D.	Director	March 26, 2019

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the shareholders and the Board of Directors of Arvinas, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Arvinas, Inc. and subsidiaries (the "Company") as of December 31, 2018 and 2017, the related consolidated statements of operations and comprehensive loss, the consolidated statement of redeemable convertible preferred shares/units and changes in stockholders'/members' equity, and consolidated statement of cash flows, for the years then ended, and the related notes (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of its operations and its cash flows for the years then ended, in conformity with accounting principles generally accepted in the United States of America.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits, we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Deloitte & Touche LLP

Hartford, Connecticut
March 26, 2019

We have served as the Company's auditor since 2016.

ARVINAS, INC. AND SUBSIDIARIES

Consolidated Balance Sheets

	December 31, 2018	December 31, 2017
Assets		
Current assets:		
Cash and cash equivalents	$ 3,190,056	$ 30,912,391
Marketable securities	184,637,640	8,258,982
Account receivable	2,775,831	25,000,000
Other receivables	2,255,966	1,040,452
Prepaid expenses and other current assets	2,818,286	316,903
Total current assets	195,677,779	65,528,728
Property, equipment and leasehold improvements, net	3,583,036	1,298,881
Other assets:		
Deposits	20,760	20,760
Total assets	$ 199,281,575	$ 66,848,369
Liabilities and members'/stockholders' equity		
Current liabilities:		
Accounts payable	$ 2,758,184	$ 596,527
Accrued expenses	4,001,276	3,545,936
Deferred revenue	16,065,957	13,553,136
Current portion of long-term debt	154,461	159,265
Total current liabilities	22,979,878	17,854,864
Deferred revenue	37,484,714	48,545,625
Long term debt, net of current portion	2,000,000	151,122
Other non-current liability	150,000	—
Preferred unit warrant liability	—	50,888
Total liabilities	62,614,592	66,602,499
Commitments and contingencies (Note 12)		
Series A redeemable convertible preferred units, no par value, at redemption value, 22,463,665 units issued and outstanding as of December 31, 2017	—	19,768,025
Series B redeemable convertible preferred units, no par value, at redemption value, 24,977,489 units issued and outstanding as of December 31, 2017	—	41,712,407
Stockholders'/Members' equity:		
Common units, no par value, 1,897,544 units issued and outstanding as of December 31, 2017	—	6,167
Incentive units, no par value, 3,669,963 units issued as of December 31, 2017	—	1,186,419
Common stock, $0.001 par value, 31,235,458 shares issued and outstanding as of December 31, 2018	31,236	—
Accumulated deficit	(302,264,619)	(62,417,397)
Additional paid-in capital	439,118,089	—
Accumulated other comprehensive loss	(217,723)	(9,751)
Total stockholders'/members' equity	136,666,983	(61,234,562)
Total liabilities and stockholders'/members' equity	$ 199,281,575	$ 66,848,369

See accompanying notes

ARVINAS, INC. AND SUBSIDIARIES

Consolidated Statements of Operations and Comprehensive Loss

Consolidated Statements of Operations	Year Ended December 31, 2018	2017
Revenue	$ 14,323,920	$ 7,578,876
Operating expenses:		
Research and development	45,193,830	28,792,902
General and administrative	12,932,168	3,546,241
Total operating expenses	58,125,998	32,339,143
Loss from operations	(43,802,078)	(24,760,267)
Other income (expenses)		
Other income, net	102,730	554,159
Change in fair value of preferred unit warrant	(193,779)	5,871
Interest income	2,470,101	201,388
Interest expense	(57,440)	(50,357)
Total other income	2,321,612	711,061
Net loss	(41,480,466)	(24,049,206)
Change in redemption value of redeemable preferred units	(198,366,756)	(4,570,431)
Net loss attributable to common shares/units	$ (239,847,222)	$ (28,619,637)
Net loss per common share/unit, basic and diluted	$ (25.45)	$ (15.08)
Weighted average common shares/units outstanding, basic and diluted	9,422,799	1,897,544

Consolidated Statements of Comprehensive Loss	Year Ended December 31, 2018	2017
Net loss	$ (41,480,466)	$ (24,049,206)
Other comprehensive gain (loss):		
Unrealized gain (loss) on available-for-sale securities	(207,972)	18,928
Comprehensive loss	$ (41,688,438)	$ (24,030,278)

See accompanying notes

ARVINAS, INC AND SUBSIDIARIES

Consolidated Statements of Redeemable Convertible Preferred Shares/Units and Changes in Stockholders'/Members' Equity

	Series A Redeemable Convertible Preferred		Series B Redeemable Convertible Preferred		Series C Redeemable Convertible Preferred		Series A, B and C Convertible Preferred	
	Units	Amount	Units	Amount	Units	Amount	Shares	Amount
Balance at December 31, 2016	22,463,665	$ 15,300,002	24,977,489	$ 41,609,999	—	$ —	—	$ —
Incentive unit-based compensation	—	—	—	—	—	—	—	—
Net loss	—	—	—	—	—	—	—	—
Change in redemption value of redeemable convertible preferred units		4,468,023		102,408				
Unrealized gain on available-for-sale securities	—	—	—	—	—	—	—	—
Balance at December 31, 2017	22,463,665	19,768,025	24,977,489	41,712,407	—	—	—	—
Incentive unit-based compensation	—	—	—	—	—	—	—	—
Exercise of Series A redeemable convertible preferred warrant	110,116	319,667	—	—	—	—	—	—
Issuance of Series C redeemable convertible preferred units	—	—	—	—	16,467,066	55,000,001	—	—
Change in redemption value of redeemable convertible preferred units	—	91,044,716	—	81,253,577	—	26,068,463	—	—
Net loss	—	—	—	—	—	—	—	—
Conversion of redeemable convertible preferred units to redeemable convertible preferred shares	(22,573,781)	(111,132,408)	(24,977,489)	(122,965,984)	(16,467,066)	(81,068,464)	64,018,336	315,166,856
Conversion of common and incentive units to common and restricted stock	—	—	—	—	—	—	—	—
Issuance of common stock, net of underwriters' discounts and issuance costs of $12,048,129	—	—	—	—	—	—	—	—
Conversion of redeemable convertible preferred stock to common stock	—	—	—	—	—	—	(64,018,336)	(315,166,856)
Restricted stock vesting	—	—	—	—	—	—	—	—
Unrealized loss on available-for-sale securities	—	—	—	—	—	—	—	—
Balance at December 31, 2018	—	$ —	—	$ —	—	$ —	—	$ —

See accompanying notes

ARVINAS, INC AND SUBSIDIARIES

Consolidated Statements of Redeemable Convertible Preferred Shares/Units and Changes in Stockholders'/Members' Equity

	Common		Common		Incentive		Accumulated	Additional Paid-in	Accumulated Other Comprehensive	Total Members' /Stockholders'
	Units	Amount	Shares	Amount	Units	Amount	Deficit	Capital	Loss	Equity
Balance at December 31, 2016	1,897,544	$ 6,167	—	$ —	3,066,734	$ 941,371	$ (33,797,760)	$ —	$ (28,679)	$ (32,878,901)
Incentive unit-based compensation	—	—	—	—	603,229	245,048	—	—	—	245,048
Change in redemption value of redeemable convertible preferred units	—	—	—	—	—	—	(4,570,431)	—	—	(4,570,431)
Net loss	—	—	—	—	—	—	(24,049,206)	—	—	(24,049,206)
Unrealized gain on available-for-sale securities	—	—	—	—	—	—	—	—	18,928	18,928
Balance at December 31, 2017	1,897,544	6,167	—	—	3,669,963	1,186,419	(62,417,397)	—	(9,751)	(61,234,562)
Incentive unit/share-based compensation	—	—	—	—	1,680,386	2,489,061	—	9,141,239	—	11,630,300
Exercise of Series A redeemable convertible preferred warrant	—	—	—	—	—	—	—	—	—	—
Issuance of Series C redeemable convertible preferred units	—	—	—	—	—	—	—	—	—	—
Change in redemption value of redeemable convertible preferred units	—	—	—	—	—	—	(198,366,756)	—	—	(198,366,756)
Net loss	—	—	—	—	—	—	(41,480,466)	—	—	(41,480,466)
Conversion of redeemable convertible preferred units to redeemable convertible preferred shares	—	—	—	—	—	—	—		—	—
Conversion of common and incentive units to common and restricted stock	(1,897,544)	(6,167)	3,692,765	3,693	(5,350,349)	(3,675,480)	—	3,677,954	—	—
Issuance of common stock, net of underwriters' discounts and issuance costs of $12,048,129	—	—	7,700,482	7,700	—	—	—	111,151,883	—	111,159,583
Conversion of redeemable convertible preferred shares to common stock	—	—	19,697,928	19,698	—	—	—	315,147,158	—	315,166,856
Restricted stock vesting	—	—	144,283	145	—	—	—	(145)	—	—
Unrealized loss on available-for-sale securities	—	—	—	—	—	—	—	—	(207,972)	(207,972)
Balance at December 31, 2018	—	$ —	31,235,458	$31,236	—	$ —	$(302,264,619)	$439,118,089	$ (217,723)	$ 136,666,983

See accompanying notes

ARVINAS, INC. AND SUBSIDIARIES

Consolidated Statements of Cash Flows

	Years Ended December 31,	
	2018	2017
Cash flows from operating activities:		
Net loss	$ (41,480,466)	$ (24,049,206)
Adjustments to reconcile net loss to net cash provided by (used in) operating activities:		
Amortization of debt discount	17,963	17,963
Change in fair value of preferred unit warrant liability	193,779	(5,871)
Depreciation and amortization	706,000	347,395
Net accretion of bond discounts/(premiums)	248,069	344,109
Non-cash share/unit-based compensation	11,630,300	245,048
Changes in operating assets and liabilities:		
Other receivables	(1,215,514)	369,729
Account receivable	22,224,169	(25,000,000)
Prepaid expenses and other current assets	(2,501,383)	(2,061)
Accounts payable	2,002,163	(969,479)
Accrued expenses	455,340	1,894,343
Deferred liability	150,000	—
Deferred revenue	(8,548,090)	51,921,124
Net cash provided by (used in) operating activities	(16,117,670)	5,113,094
Cash flows from investing activities:		
Purchase of marketable securities	(234,894,225)	(3,200,895)
Maturities of marketable securities	58,059,526	16,008,000
Sales of marketable securities	—	9,077,435
Purchase of property, equipment and leasehold improvements	(2,830,661)	(1,012,428)
Net cash provided by (used in) investing activities	(179,665,360)	20,872,112
Cash flows from financing activities:		
Repayments of long term debt	(173,889)	(161,363)
Proceeds from long term debt	2,000,000	—
Proceeds from issuance of common stock	114,583,172	—
Payment of common stock offering costs	(3,423,589)	—
Proceeds from issuance of Series C redeemable convertible preferred units	55,000,001	—
Proceeds from exercise of warrant	75,000	—
Net cash provided by (used in) financing activities	168,060,695	(161,363)
Net increase (decrease) in cash and cash equivalents	(27,722,335)	25,823,843
Cash and cash equivalents, beginning of the period	30,912,391	5,088,548
Cash and cash equivalents, end of the period	$ 3,190,056	$ 30,912,391
Supplemental disclosure of cash flow information:		
Purchases of property, equipment and leasehold improvements unpaid at period end	$ 159,494	$ —
Cash paid for interest	$ 39,476	$ 32,393
Increase (decrease) in redemption value of preferred units	$ 198,366,756	$ 4,570,431

See accompanying notes

1. Nature of Business

Arvinas, Inc. has five wholly owned subsidiaries, Arvinas Operations, Inc., Arvinas Androgen Receptor, Inc., Arvinas Estrogen Receptor, Inc., Arvinas BRD4, Inc., and Arvinas Winchester, Inc. (collectively, the Company). Arvinas Operations, Inc. was formed in 2013, Arvinas Androgen Receptor, Inc. was formed in 2015, Arvinas Estrogen Receptor, Inc. and Arvinas BRD4, Inc. were formed in 2016, and Arvinas Winchester, Inc. was formed in 2018. In September 2018, the Company converted from a Delaware limited liability company to a Delaware corporation. All periods prior to the date of conversion represent the results of the limited liability corporation. The Company is a biopharmaceutical company dedicated to improving the lives of patients suffering from debilitating and life-threatening diseases throughout the discovery, development and commercialization of therapies to degrade disease-causing proteins.

Arvinas, Inc. was incorporated in Delaware on July 3, 2013. Effective January 1, 2015, Arvinas Holding Company, LLC (Arvinas LLC) was formed by the shareholders of Arvinas, Inc. and Arvinas, Inc. became a wholly owned subsidiary of Arvinas LLC. In connection with this reorganization, the rights and preferences of the Preferred Stock of Arvinas, Inc. were exchanged for preferred stock units with similar rights and preferences of Arvinas LLC. As part of the reorganization, the employees, consultants and board members of Arvinas, Inc. exchanged their stock options in Arvinas, Inc. stock in exchange for incentive units in Arvinas LLC. Additionally, common stock holders of Arvinas, Inc. exchanged their common stock for common units in Arvinas LLC. All exchanges were made on a 1-for-1 basis. This reorganization was accounted for as a common control transaction as the common stockholders of Arvinas, Inc. formed Arvinas, LLC and transferred all the assets from Arvinas, Inc. to Arvinas LLC.

The Company's Board of Managers approved a one-for-3.25 reverse stock split of its issued and outstanding shares of common units and a proportional adjustment to the existing conversion ratios for the Company's Series A, Series B, and Series C preferred units effective as of September 14, 2018. Accordingly, all share/unit and per share/unit amounts for all periods presented in the accompanying financial statements and notes thereto have been retroactively adjusted, where applicable, to reflect this reverse unit split and adjustment of the preferred unit conversion ratios. Immediately prior to the effectiveness of the registration statement pertaining to the Company's initial public offering on September 26, 2018, the Company converted from a Delaware limited liability company to a Delaware corporation. Pursuant to the plan of conversion, each outstanding Series A, Series B, and Series C preferred units converted into an equal number of shares of Series A, Series B, and Series C preferred stock, each outstanding common unit converted into a share of common stock and each outstanding incentive unit converted into a number of shares of common stock and restricted stock based on a conversion price determined by the board of directors. The Company issued 1,795,221 shares of common stock and 1,268,923 shares of restricted stock.

On October 1, 2018, the Company completed an initial public offering (IPO) in which the Company issued and sold 7,500,000 shares of common stock at a public offering price of $16.00 per share. In October 2018, the underwriters of the IPO exercised in part their option to purchase 200,482 additional shares of the Company's common stock at an offering price of $16.00 per share. The Company's aggregate gross proceeds from the sale of shares in the IPO, including the option, was $123.2 million before fees and expenses of $12.0 million.

On October 1, 2018, all of the outstanding shares of convertible preferred stock automatically converted into 19,697,928 shares of common stock at the applicable conversion ratio then in effect. Subsequent to the closing of the IPO, there were no shares of preferred stock outstanding.

2. Summary of Significant Accounting Policies

Principles of Consolidation

The consolidated financial statements of the Company include the accounts of Arvinas Inc. and its wholly owned subsidiaries. All intercompany transactions have been eliminated in consolidation.

Use of Estimates

The preparation of the Company's consolidated financial statements in conformity with accounting principles generally accepted in the United States requires management to make certain estimates and assumptions that affect the reported amounts and disclosures in the financial statements. While management believes that estimates and assumptions used in the preparation of the consolidated financial statements are appropriate, actual results could differ from those estimates. The most significant estimates are those used in determination of the Company's revenue recognition, fair value of its common and preferred units, preferred unit warrant liability and incentive equity compensation.

Financial Instruments

The Company's principal financial instruments comprise cash, marketable securities, account receivable, accounts payable, accrued liabilities and long-term debt. The carrying value of all financial instruments approximates fair value.

Cash and Cash Equivalents

The Company classifies as cash and cash equivalents amounts on deposit in banks and cash invested temporarily in various instruments, primarily money market accounts, with original maturities of three months or less at time of purchase. The carrying amounts reported in the consolidated balance sheets represent the fair values of cash and cash equivalents.

Concentration of Credit Risk

The Company maintains its cash in financial institution accounts that, at times during the year, may exceed federally insured limits. The cash balances in the financial institutions are insured by the Federal Deposit Insurance Corporation (FDIC) up to $250,000. Cash may also be maintained at commercial institutions that are not insured by the FDIC.

For the year ended December 31, 2018, two collaborators each represented over 45% of total revenue. One collaborator accounted for the entire account receivable balance at December 31, 2018 and 2017. For the year ended December 31, 2017, two collaborators represented 60% and 40% of total revenue.

Marketable Securities

The Company classifies its marketable securities as available-for-sale securities, which are carried at their fair value based on the quoted market prices of the securities with unrealized gains and losses reported as accumulated other comprehensive loss, a separate component of members' equity. Realized gains and losses on available-for-sale securities are included in net earnings in the period earned or incurred.

Property, Equipment, and Leasehold Improvements

Property and equipment are recorded at cost. Depreciation is calculated using the straight-line method over the estimated useful lives, which range from three years for office equipment to five years for laboratory equipment. Maintenance and repairs which do not extend the lives of the assets are charged directly to expense as incurred. Upon retirement or disposal, cost and related accumulated depreciation are removed from the related accounts, and any resulting gain or loss is recognized as a component of income or loss for the period. Leasehold improvements are recorded at cost and amortized using the straight-line method over the shorter of the lease term or the useful life of the asset.

Impairment of Long-Lived Assets

When indications of potential impairments are present, the Company evaluates the carrying value of long-lived assets. The Company adjusts the carrying value of the long-lived assets if the sum of undiscounted expected future cash flows is less than carrying value. No such impairments were recorded during 2018 or 2017.

Deferred Financing Costs

Deferred financing costs are being amortized over the term of the related debt. The Company recorded $5,605 of non-cash interest expense relating to the deferred financing costs for each of the years ended December 31, 2018 and 2017.

Segment Information

The Company manages its operations as a single segment for the purposes of assessing performance and making operating decisions. All of the Company's tangible assets are held in the United States. To date, all of the Company's revenue has been generated in the United States.

Revenue Recognition and Deferred Revenue

Revenues from Contracts

As discussed under New Accounting Pronouncements, the Company adopted Accounting Standards Codification (ASC) 606, ***Revenue from Contracts with Customers***, as of January 1, 2017 using the full retrospective method.

The Company's revenue is generated through research collaboration and license agreements with pharmaceutical partners. The terms of these agreements contain multiple goods and services which may include (i) licenses, (ii) research and development activities, and (iii) participation in joint research and development steering committees. The terms of these agreements may include non-refundable upfront license or option fees, payments for research and development activities, payments upon the achievement of certain milestones, and royalty payments based on product sales derived from the collaboration. Under ASC 606, the Company evaluates whether the license agreement, research and development services, and participation in research and development steering committees, represent separate or combined performance obligations. The Company has determined that these services within its existing contracts represent a combined single performance obligation.

The research collaboration and license agreements typically include contingent milestone payments related to specified preclinical and clinical development milestones and regulatory milestones. These milestone payments represent variable consideration to be included within the transaction price using the most likely amount method. The Company determined that the most likely amount to be recognized was zero, against which no constraint was applied. The Company will continue to assess the probability of significant reversals for any amounts that become likely to be realized prior to recognizing the variable consideration associated with these payments within the transaction price.

Revenue is recognized ratably over the Company's expected performance period under each respective arrangement. The Company makes its best estimate of the period over which the Company expects to fulfill the Company's performance obligations, which includes access to technology through the license agreement and research activities. Given the uncertainties of these collaboration arrangements, significant judgment is required to determine the duration of the performance period.

For the years ended December 31, 2018 and 2017, the transaction price allocated to the combined performance obligation identified under the agreements is recognized as revenue on a straight-line basis over the estimated performance period under each respective arrangement. Straight-line basis was considered the best measure of progress in which control of the combined obligation transfers to the customers, due to the contract containing license rights to technology, research and development services, and joint committee participation, which in totality are expected to occur ratably over the performance period.

The Company's contracts may also call for certain sales-based milestone and royalty payments upon successful commercialization of a target. The Company recognizes revenues from sales-based milestone and royalty payments at the later of a) the occurrence of the subsequent sale; or b) the performance obligation to which some or all of the sales-based milestone or royalty payments has been allocated has been satisfied (or partially satisfied). The Company anticipates recognizing these milestones and royalty payments if and when subsequent sales are generated by the customer from the use of the technology. To date, no revenue from these sales-based milestone and royalty payments has been recognized for any periods.

Amounts received prior to satisfying the above revenue recognition criteria are recorded as a contract liability in the Company's accompanying consolidated balance sheets.

Preferred Unit Warrants

Preferred unit warrants issued in conjunction with debt financings were initially recorded at fair value, using a Black-Scholes option pricing model, with a corresponding discount recorded against the face value of the note and a liability. The discount was then accreted against the face value of the note over its remaining term as additional interest expense.

The Company classified warrants to purchase shares of its Series A Redeemable Convertible Preferred Units (Series A Preferred Units) as a liability on its balance sheets as these warrants were free-standing financial instruments that were exercisable for contingently redeemable shares. The preferred unit warrants were recorded in long-term liabilities at fair value, estimated using the Black-Scholes option pricing model, and marked to market at each balance sheet date. The change in carrying value was reported as the change in fair value of warrant liability in the accompanying consolidated statements of operations.

Income Taxes

Arvinas LLC was taxed under the provisions of Subchapter K—Partners and Partnerships of the Internal Revenue Code. Under those provisions, Arvinas LLC did not pay federal or state corporate income taxes on its taxable income. Instead, each member would include net operating income or loss for Arvinas LLC on its individual return. Arvinas LLC was converted to a C corporation in 2018.

Arvinas, Inc. and its wholly owned subsidiaries use the asset and liability method of accounting for income taxes, as set forth in ASC 740, ***Accounting for Income Taxes***. Under this method, deferred tax assets and liabilities are recognized for the expected future tax consequence of temporary differences between the carrying amounts and the tax basis of assets and liabilities and net operating loss carry forwards, all calculated using presently enacted tax rates (see Note 11).

Management has evaluated the effect of ASC 740 guidance related to uncertain income tax positions and concluded that the Company has no significant uncertain income tax positions at December 31, 2018 and 2017.

Equity-based Compensation

Prior to its IPO, the Company periodically granted incentive units to employees and non-employees, which generally vested over a four-year period. The incentive units represented a separate substantive class of equity with defined rights within the LLC Operating Agreement. The incentive units represented profits interests in the Company, which was an interest in the increase in the value of the entity over the Participation Threshold, as defined in the LLC Operating Agreement and as determined at the time of grant. The holder, therefore, had the right to participate in distributions of profits only in excess of the Participation Threshold. The Participation Threshold was based on the valuation of the common unit on or around the grant date.

The Company accounted for incentive units granted in accordance with ASC 718, ***Compensation-Stock Compensation*** (ASC 718). In accordance with ASC 718, compensation expense is measured at estimated fair value of the incentive units and is included as compensation expense over the vesting period during which an employee provides service in exchange for the award.

The Company used a Black-Scholes option pricing model to determine fair value of its incentive units. The Black-Scholes option pricing model includes various assumptions, including the expected life of incentive units using the simplified method, the expected volatility and the expected risk-free interest rate. These assumptions reflected the Company's best estimates, but they involve inherent uncertainties based on market conditions generally outside the control of the Company. As a result, if other assumptions had been used, unit-based compensation cost could have been materially impacted.

The Company measures employee and board of director equity-based compensation for stock option and restricted stock grants based on the grant date fair value of the equity awards. Equity-based compensation expense is recognized over the requisite service period of the awards. For equity awards that have a performance condition, the Company recognizes compensation expense based on its assessment of the probability that the performance condition will be achieved.

The Company measures equity awards granted to consultants based on the fair value of the award on the date the award is granted. 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 that equity award.

The Company classifies equity-based compensation expense in its consolidated statement of operations in the same manner in which the award recipient's salary and related costs are classified or in which the award recipient's service payments are classified.

Research and Development

Research and development costs are expensed as incurred. The Company records grants from governmental and non-profit agencies as a reduction in research and development expense. Grants are recognized when there is reasonable assurance that the Company will comply with the conditions attached to the grant arrangement and the grant will be received. Grant payments received related to research and development costs incurred prior to the approval of the qualifying program are recognized immediately upon approval of the program by the grantor.

Fair Value Measurements

ASC Topic 820, ***Fair Value Measurements and Disclosures***, requires disclosure of the fair value of financial instruments held by the Company. ASC 825, ***Financial Instruments***, defines fair value and establishes a three-level valuation hierarchy for disclosures of fair value measurement that enhances disclosure requirements for fair value measures. The three levels of valuation hierarchy are defined as follows:

Level 1—Inputs are based upon observable or quoted prices for identical instruments traded in active markets.

Level 2—Inputs are based upon quoted prices for similar instruments in active markets, quoted prices for identical or similar instruments in markets that are not active, and model-based valuation techniques for which all significant assumptions are observable in the market or can be corroborated by observable market data for substantially the full term of the assets or liabilities. The Company's Level 2 investments consist primarily of corporate notes and bonds and U.S. government and agency securities.

Level 3—Inputs are generally unobservable and typically reflect management's estimates of assumptions that market participants would use in pricing the asset or liability. The fair values are therefore determined using model-based techniques that include option pricing models, discounted cash flow models, and similar techniques.

In determining fair value, the Company utilizes valuation techniques that maximize the use of observable inputs and minimize the use of unobservable inputs to the extent possible as well as considers counterparty credit risk in its assessment of fair value.

The Company's marketable securities consist of corporate bonds and a government bond which are adjusted to fair value each balance sheet date, based on quoted prices, which are considered Level 2 inputs (see Note 5). The fair value of the preferred unit warrant liability was measured on a recurring basis and was considered a Level 3 instrument in the fair value hierarchy. See Note 8 for the valuation method used and significant assumptions used in the valuation.

The following tables summarize the fair values and levels within the fair value hierarchy in which the fair value measurements fall for assets and liabilities measured on a recurring basis as of:

December 31, 2018

Description	Level 1	Level 2	Level 3	Total
Assets:				
Corporate bonds	$ —	$181,668,600	$ —	$181,668,600
Government securities	—	2,969,040	—	2,969,040

December 31, 2017 Description	Level 1	Level 2	Level 3	Total
Assets:				
Corporate bonds	$ —	$ 8,258,982	$ —	$ 8,258,982
Liabilities:				
Preferred unit warrant	$ —	$ —	$ 50,888	$ 50,888

The following table presents the changes in Level 3 instruments measured on a recurring basis for the years ended December 31, 2018 and 2017:

	Preferred Unit Warrant
Balance at December 31, 2016	$ 56,759
Change in fair value	(5,871)
Balance at December 31, 2017	50,888
Change in fair value	193,779
Exercise of warrant	(244,667)
Balance at December 31, 2018	$ —

Fluctuation in the fair value of the Company's Series A Preferred Units was the primary driver for the change in the Preferred Unit Warrant liability valuation during each year prior to its exercise. As the fair value of the Series A Preferred Units increase, the value to the holder of the instrument generally increases. Additionally, unit price volatility is one of the significant unobservable inputs used in the fair value measurement of the Company's Preferred Unit Warrant liability. A decrease in expected volatility would generally result in a lower fair value measurement.

The carrying value of accounts payable and accrued expenses approximate their fair value due to the short-term nature of these assets and liabilities.

Redeemable Preferred Units

The Company classified redeemable preferred units as temporary equity in the accompanying consolidated balance sheets due to certain redemption events that were outside the Company's control, including the passage of time. The Company recorded the redeemable preferred units at its redemption value as of the balance sheet date.

Net Loss per Common Share/Unit

Basic net loss per common share/unit is computed by dividing net loss, after adjusting for redeemable preferred unit dividends, by the weighted-average number of common shares/units outstanding during the period. The change in current redemption value of the redeemable preferred units was treated as a deemed dividend for all periods presented. Diluted net loss per share/unit was computed using the weighted-average number of common shares/units outstanding during the period and, if dilutive, the weighted average number of potential shares of common shares/units. The effect of the conversion of redeemable preferred units into common units was excluded from the computation of diluted net loss per common unit for all periods as their effect was antidilutive. Additionally, common share/unit equivalents are excluded from the computation of diluted net loss per common unit for all periods as their effect is antidilutive.

New Accounting Pronouncements

Recently Adopted Accounting Pronouncements

In March 2016, the Financial Accounting Standards Board (FASB) issued ASU No. 2016-09, ***Compensation—Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting***. ASU 2016-09 simplifies several aspects of the accounting for employee share-based payment transactions, including income tax consequences, classification of awards as either equity or liabilities, and classification in the statement of cash flows. ASU 2016-09 is effective for annual reporting periods beginning after December 15, 2016, and interim periods within those annual periods. Early adoption was permitted. The Company adopted ASU 2016-09 on January 1, 2017 and the adoption did not have a material impact on the accompanying consolidated financial statements.

Recently Issued Accounting Pronouncements

In February 2016, the FASB issued ASU No. 2016-02, ***Leases***. ASU 2016-02 requires lessees to present right-of-use assets and lease liabilities on the balance sheet for all leases with terms longer than 12 months. The guidance is effective for years beginning after December 15, 2018 and is to be applied using a modified retrospective approach applied at the beginning of the earliest comparative period in the financial statements or in the year of adoption with a cumulative effect to the opening balance of retained earnings. Early adoption is permitted. The Company will adopt ASU 2016-02 in the first quarter of 2019 using the modified retrospective transition approach and will recognize any cumulative effect of applying the standard as an adjustment to the opening balance of retained earnings as of January 1, 2019. The Company has nearly completed its assessment of ASU 2016-02 and the impact on its consolidated financial statements and related disclosures, and expects the adoption of this standard will result in the recognition of right-of-use assets and related lease liabilities of approximately $2.4 million related to its operating lease commitments on the Consolidated Balance Sheet as of January 1, 2019, with no impact to the opening balance of retained earnings. ASU 2016-02 is not expected to have a material impact on the Company's Consolidated Statements of Income, Consolidated Statements of Comprehensive Income, and Consolidated Statements of Cash Flow.

In June 2018, the FASB issued ASU No. 2018-07, ***Improvements in Nonemployee Share-Based Payment Accounting***. ASU 2018-07 aligns the accounting for share-based payment awards to nonemployees with the accounting for share-based awards to employees. ASU 2018-07 is effective for interim and annual reporting periods beginning after December 15, 2018 and early adoption is permitted. The Company is still in the process of determining the effect that the adoption of ASU 2018-07 will have on the accompanying consolidated financial statements.

Other accounting standards that have been issued by the FASB or other standards-setting bodies that do not require adoption until a future date are not expected to have a material impact on the Company's financial statements upon adoption.

3. License Agreements

In July 2013, the Company entered into an exclusive license agreement, including the right to grant sublicenses, with Yale University to develop protein degradation technologies. In connection with the execution of this license agreement, the Company made a non-refundable upfront payment of $149,511. In addition to the upfront payment, the Company paid Yale University a License Maintenance Royalty of varying amounts through the fourth anniversary of the license agreement. After 2017 and until the first sale to a third party of any licensed product, the minimum annual payment will be $75,000. During 2018 and 2017, the Company paid $75,000 and $50,000, respectively, under the license agreement.

The Company is also required to pay Yale University success-based milestones for the development of the protein degradation technologies as well as low single-digit running royalties on aggregate worldwide net sales of certain licensed products, which may be subject to reductions, and subject to a minimum royalty payment that ranges from $200,000 to $500,000. If the Company sublicenses the protein degradation technologies to a third party, the Company is required to pay Yale University a mid-single digit to mid-double digit percentage of Sublicense Income (as defined in the agreement). During 2015, the Company paid $750,000 to Yale University as a result of the Company entering into its first Research Collaboration and License Agreement representing the maximum amount to be paid for consideration received prior to the filing of an IND for a licensed product. The Company is also required to reimburse Yale University for patent costs incurred. During 2018 and 2017, the Company reimbursed Yale University $216,093 and $109,287, respectively, for patent costs.

4. Research Collaboration and License Agreements

In December 2017, the Company entered into a Research Collaboration and License Agreement with Pfizer, Inc. Under the terms of the agreement, the Company received an upfront non-refundable payment and certain additional payments totaling $28.0 million in 2018 in exchange for use of the Company's technology license and to fund Pfizer-related research as defined within the agreement. These payments are being recognized as revenue over the total estimated period of performance. The Company is also eligible to receive up to an additional $37.5 million in non-refundable option payments if Pfizer exercises its options for all targets under the agreement. Pfizer exercised an option for $2.5 million in December 2018 and the amount is included in accounts receivable at December 31, 2018. The Company is also entitled to receive up to $225 million in development milestone payments and up to $550 million in sales-based milestone payments for all designated targets under the agreement, as well as tiered royalties based on sales.

In September 2015, the Company entered into an Option and License Agreement with Genentech, Inc. and F. Hoffman-La Roche Ltd (the Genentech Agreement). During 2015, the Company received an upfront non-refundable payment of $11.0 million in exchange for use of the Company's technology license and to fund Genentech-related research as defined within the Genentech Agreement. In November 2017, the Company entered into an Amended and Restated Option, License, and Collaboration Agreement with Genentech, Inc. and F. Hoffman-La Roche Ltd (the Genentech Modification), amending the Genentech Agreement. Under the Genentech Modification, the Company received additional upfront non-refundable payments of $34.5 million to fund Genentech-related research and Genentech has the right to designate up to ten targets. Upfront non-refundable payments are recognized as revenue over the total estimated period of performance. The Company is eligible to receive up to $44.0 million per target in development milestone payments, $52.5 million in regulatory milestone payments and $60.0 million in commercial milestone payments based on sales as well as tiered royalties based on sales. In connection with the Genentech Modification, the Company recognized an increase in revenue previously recognized of $0.4 million due to the offsetting impacts effect of an increase in total transaction price and an increase in expected period of performance.

In April 2015, the Company entered into a Research Collaboration and License Agreement with Merck Sharp & Dohme Corp. (the Merck Agreement). During 2015, the Company received an upfront non-refundable payment of $7.0 million, which was recognized as revenue over the total estimated period of performance, in exchange for use of the Company's technology license. The agreement also provided for research program funding to support Merck-related research. The agreement expired in April 2018.

Information about contract liabilities, included as deferred revenue in the accompanying Consolidated Balance Sheets, is as follows:

	2018	2017
Contract liabilities	$ 53,550,671	$ 62,098,761
Revenues recognized in the period from:		
Amounts included in deferred revenue in previous periods	13,553,136	6,600,000

Changes in deferred revenue from 2017 to 2018 were due to billings of $5.8 million under new and modified contracts and $14.3 million of revenue recognized on the research collaboration and license agreements.

The aggregate amount of the transaction price allocated to performance obligations that are unsatisfied as of December 31, 2018 was $53.6 million, which is expected to be recognized as follows (in millions):

2019	$ 16.1
2020	13.6
2021	13.5
2022	8.6
2023	1.8
	$ 53.6

5. Marketable Securities

The following is a summary of the Company's available-for-sale securities as of December 31, 2018 and 2017.

December 31, 2018 Description	Effective Maturity	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
Corporate bonds	2019	$154,859,427	$ —	$(165,630)	$154,693,797
Government bonds	2019	2,966,262	2,778	—	2,969,040
Corporate bonds	2020	27,029,673		(54,870)	26,974,803
Total		$184,855,362	$ 2,778	$(220,500)	$184,637,640

December 31, 2017 Description	Effective Maturity	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
Corporate bonds	2018	$8,268,732	$ —	$ (9,751)	$8,258,982

6. Property, Equipment and Leasehold Improvements

Property, equipment and leasehold improvements consist of the following at December 31:

	2018	2017
Laboratory equipment	$ 3,757,265	$ 1,952,685
Office equipment	577,418	305,522
Leasehold improvements	981,884	72,294
	5,316,567	2,330,501
Less: accumulated depreciation	(1,733,531)	(1,031,620)
Property, equipment and leasehold improvements, net	$ 3,583,036	$ 1,298,881

Depreciation expense totaled $706,000 and $347,395 for the years ended December 31, 2018 and 2017, respectively.

7. Accrued Expenses

Accrued expenses consisted of the following at December 31:

	2018	2017
Employee expenses	$ 2,795,205	$ 1,047,022
Research and development expenses	357,148	1,982,525
Professional fees and other	848,923	516,389
	$ 4,001,276	$ 3,545,936

8. Long-Term Debt

In August 2013, the Company entered into a Loan Agreement (Loan) and a Stock Subscription Warrant, with Connecticut Innovations, Incorporated (CII). Under the Loan, the Company can draw up to $750,000 for the purpose of purchasing laboratory equipment, information technology equipment and leasehold improvements. Leasehold improvements are limited to $100,000. Interest on the Loan is compounded on a monthly basis at a rate of 7.50% per annum and is required to be paid on a monthly basis beginning on the date of the first draw of funds for 10 months, then with principal payments beginning on June 1, 2015 and payable monthly until the maturity date of July 31, 2019. The Company has the ability to prepay the amount due at any time prior to the maturity date without premium or penalty. The Loan is secured by substantially all of the Company's assets. As of December 31, 2018, and 2017, the amount outstanding under the Loan was $169,610 and $343,500, respectively.

In connection with the issuance of the Loan, and as additional consideration, the Company granted CII a warrant to purchase 110,116 shares of the Company's Series A Preferred Stock at a purchase price of $0.6811 per share, with a term of 7 years from the date of issuance (CII Series A Preferred Stock Warrant). Effective January 1, 2015, the CII Series A Unit Preferred Stock Warrant was exchanged for a warrant to purchase 110,116 units of the Company's Series A redeemable convertible preferred units (CII Series A Preferred Unit Warrant).The fair value of the CII Series A Preferred Unit Warrant of $61,796 was determined using the Black Scholes option pricing model and was recorded as a debt discount and is being amortized as non-cash interest expense over the term of the Loan. At December 31, 2018 and 2017, the total unamortized debt discount on the Loan totaled $7,210 and $19,569, respectively. Interest expense recorded related to the amortization of the debt discount in 2018 and 2017 was $12,359 in each year. The Company evaluated the CII Series A Preferred Unit Warrant issued under authoritative guidance and determined that the CII Series A Preferred Unit Warrant does not meet the conditions to be classified as equity and has classified the CII Series A Preferred Unit Warrant as a liability at fair value on the accompanying balance sheets. The warrant was exercised in July 2018.

The fair value of the CII Series A Preferred Unit Warrant was determined using the Black-Scholes option pricing model with the following assumptions:

	December 31, 2017
Expected volatility	100%
Expected term (years)	2.67
Risk free interest rate	1.91%
Expected dividend yield	0%
Fair value of underlying Series A Preferred Units	$ 0.98

In connection with an Assistance Agreement with the State of Connecticut (Assistance Agreement) entered into in 2014, under which all the borrowings by the Company were forgiven in accordance with the Assistance Agreement, the Company is required to be located in the State of Connecticut through January 2024,with a default penalty of repayment of the full original funding amount of $2.5 million plus liquidated damages of 7.5%.

In June 2018, the Company entered into an Assistance Agreement with the State of Connecticut (2018 Assistance Agreement) to provide funding for the expansion and renovation of laboratory and office space (Project). Under the terms of the 2018 Assistance Agreement, the Company could borrow from the State of Connecticut a maximum of $2.0 million, provided that the funding does not exceed more than 50% of the total Project costs. In September 2018, the Company borrowed $2.0 million under the 2018 Assistance Agreement, bearing interest at 3.25% per annum and interest payments will be required for the first 60 months from the funding date. Thereafter, the loan begins to fully amortize through month 120, maturing in June 2028. According to the terms of the 2018 Assistance Agreement, up to $1.0 million of the funding can be forgiven if the Company meets certain employment conditions, as defined in the agreement. The Company may also be required to prepay a portion of the loan if the employment conditions are not met. The 2018 Assistance Agreement requires that the Company be located in the State of Connecticut through June 2028 with a default penalty of repayment of the full original funding amount of $2.0 million plus liquidated damages of 7.5% of the total amount of funding received.

Anticipated future minimum payments on long-term debt, excluding the discount on debt of $7,210, for the years ending December 31 are:

2019	$ 169,610
2023	92,480
Beyond 5 years	1,907,520
Total	$ 2,169,610

During the years ended December 31, 2018 and 2017, interest expense was $57,440 and $50,357, respectively.

9. Members' Equity

Common Units

In January 2015, all issued and outstanding common stock in Arvinas, Inc. was exchanged on a 1-for-1 basis for common units of Arvinas LLC. Each common unit entitled the holder to one vote on all matters submitted to a vote of the Company's members. As noted in Note 1, in September 2018, all issued and outstanding common units were converted into common stock.

Preferred Units

During 2013 and 2014, Arvinas, Inc. sold 22,463,665 shares of Series A Redeemable Convertible Preferred Stock (Series A Preferred Stock) for $15.3 million at a price of $0.6811 per share. The Series A Preferred Stock was subsequently exchanged for Series A Preferred Units in Arvinas LLC upon the reorganization. During 2015, the Company sold 24,977,489 Series B Redeemable Convertible Preferred Units (Series B Preferred Units) in exchange for $41.6 million at a price of $1.6659 per share. In March 2018, the Company entered into a Series C Preferred Unit Purchase Agreement (the Series C Agreement) to raise additional equity. Under the terms of the Series C Agreement, the Company sold 16,467,066 units of Series C Redeemable Convertible Preferred Units (Series C Preferred Units) for $55.0 million at a price of $3.34 per unit. As noted in Note 1, in September 2018, after giving effect of the 3.25 to 1 reverse split, all issued and outstanding preferred units were converted into preferred stock and subsequently into common stock upon the closing of the IPO.

The Series A, Series B, and Series C Preferred Units (collectively, the Preferred Units) had the following rights, preferences and privileges:

Conversion Rights

At the option of the holder, each Preferred Unit was convertible into common units at any time after the date of issuance. The initial conversion price was equal to the original Series A Preferred Unit issue price of $0.6811 per unit, Series B Preferred Unit issue price of $1.6659, and Series C Preferred Unit issue price of $3.34 and was subject to adjustment as disclosed in the amended and restated operating agreement. Each Preferred Unit would automatically convert into common units at an applicable conversion rate upon the earlier of (i) the sale of the Company's common units in a public offering which is not less than $3.34 per unit and which results in gross cash proceeds of at least $70 million, or (ii) the date specified by written consent or agreement of 66.67% of the outstanding Preferred Units. The Company has concluded that the embedded feature would not be accounted for separately as the economic characteristics and risks of the embedded conversion feature are clearly and closely related to the economic characteristics and risks of the host contract, the Preferred Units, given that both represent equity interests in the Company.

Voting Rights

The holders of Preferred Units were entitled to the same voting rights as the holders of common units, with a number of votes equal to the number of common units into which such Preferred Units could be converted. The holders of a majority of the then outstanding Preferred Units would have had the right to vote upon any matter submitted to the shareholders for a vote. Certain matters, prior to being able to be undertaken by the Company, required the approval of 66.67% of the holders of the Preferred Units, voting as a separate class.

Dividends

The holders of Preferred Units were entitled to receive non-cumulating dividends if declared by the board of managers, at a rate of 8% of the original per unit price per annum, payable upon a liquidation event or upon redemption, in preference and priority to any payment of dividends on common units. No dividends were declared as of December 31, 2018 and 2017.

Redemption Rights

The Preferred Units were redeemable at the option of the holders of at least 66.67% of the Preferred Units, voting together as a single class after October 1, 2019. The redemption price equaled an amount per Preferred Unit of any series equal to the greater of (A) the Preference Amount, as defined in the agreement, of such series of Preferred Unit and (B) the fair market value of such series of Preferred Unit as determined in good faith by the board. As the units were redeemable, the Company recorded at redemption value each reporting period. The Company must, therefore, measure the fair value of the preferred units each reporting period to determine the greater of the two potential redemption values as defined above. Fair value was determined each period based on unobservable inputs and management's judgment due to the absence of quoted market prices, inherent lack of liquidity and the long-term nature of such financial instruments. The valuation was based on market approach utilizing the subject company transaction method.

Liquidation

In the event of a liquidation, dissolution or winding-up of the Company, the holders of the Preferred Units were entitled to receive, in preference to the holders of the common units and the incentive units, an amount equal to the original issue price, plus accrued but unpaid dividends. If funds were insufficient to pay the amount due, all proceeds shall have been distributed ratably to the respective amounts which would otherwise be payable in respect of the units held by them upon such distribution if all amounts payable with respect to such preferred units were paid in full. After payment of all preferential amounts to the holders of Preferred Units, all remaining funds shall be distributed pro rata to the holders of common units and Preferred Units as if the units of Preferred Units had been converted to common units prior to the distribution.

Anti-Dilution Provisions

In the event that the Company made adjustments for stock dividends, splits, combinations or other similar events or issues additional securities at a purchase price less than current Preferred Units conversion prices, the Preferred Units' conversion price would have been adjusted in accordance with weighted average formulas, as defined in the agreements.

10. Incentive Equity Plans

In the Fourth Amendment to the Company's Incentive Share Plan (the Incentive Plan) adopted in March 2018, the Company was authorized to issue up to an aggregate of 6,199,477 incentive units pursuant to the Incentive Plan. Generally, incentive units were granted at no less than fair value as determined by the board of managers and had vesting periods ranging from one to four years. The Incentive Plan was terminated in September 2018. In September 2018, the Company's board of directors adopted and the Company's stockholders approved the 2018 Stock Incentive Plan (the 2018 Plan), which became effective upon the effectiveness of the registration statement on Form S-1 for the Company's IPO. The number of common shares initially available for issuance under the 2018 Plan is the sum of (1) 4,067,007 shares of common stock; plus (2) the number of shares of common stock (up to 1,277,181) issued in respect of incentive units granted under the Incentive Plan that are subject to vesting immediately prior to the effectiveness of the registration statement that expire, terminate or are otherwise surrendered, cancelled, forfeited or repurchased by the Company at their original issuance price pursuant to a contractual repurchase right; plus (3) an annual increase on the first day of each fiscal year beginning with the fiscal year ending December 31, 2019 and continuing to, and including, the fiscal year ending December 31, 2028, equal to the lowest of 4,989,593 shares of the Company's common stock, 4% of the number of shares of the Company's common stock outstanding on the first day of the fiscal year and an amount determined by the Company's board of directors.

During 2018, the Company granted 1,715,368 incentive units to employees and directors under the Incentive Plan. The weighted average fair value of incentive units granted to employees was $4.54 per unit. In September 2018, each outstanding incentive unit was converted into a number of shares of common stock based upon the IPO price. Certain of the shares of common stock issued in respect of incentive units continue to be subject to vesting in accordance with the vesting schedule that was applicable to such incentive units, The Company granted 1,253,263 restricted shares to employees and directors as part of the conversion. The Company also granted 1,744,650 stock options to purchase shares of common stock to employees and directors who were holders of incentive units at the time of the incentive unit conversion and 286,307 in new employee grants. The weighted average fair value of stock options granted to employees and directors in 2018 was $9.88 per share. The options granted generally vest over a requisite service period of four years with a maximum contractual life of ten years from date of grant.

During 2018, the Company recognized compensation expense of $10,026,666 relating to the issuance of employee incentive awards, and at December 31, 2018, there was $14,598,081 of compensation expense that is expected to be recognized over a weighted average period of approximately 1.5 years.

In September 2018, in connection with the conversion of the incentive units, the Company granted 11,097 restricted shares of common stock and 251,010 stock options to purchase shares of common stock to consultants. Subsequent to the conversion, the Company granted 10,000 options to purchase shares of common stock to a consultant. During 2018, the Company recognized compensation expense of $1,603,633 relating to incentive share awards for consultants and, at December 31, 2018, there was $1,558,421 of compensation expense remaining to be amortized over a weighted average period of less than 1.5 years.

The fair value of the incentive units granted during the years ended December 31, 2018 and 2017 was determined using the Black-Scholes option pricing model with the following assumptions:

	2018	2017
Expected volatility	66 - 71%	75 – 80%
Expected term (years)	5.6-6.1	1.5 – 6.1
Risk free interest rate	2.5-2.9%	1.1 – 2.1%
Expected dividend yield	0%	0%
Fair value of underlying common units	$1.08-8.48	$ 0.72

The fair value of the underlying common units indicated above was utilized as the exercise price within the Black-Scholes option pricing model.

The fair value of the stock options granted during the year ended December 31, 2018 was determined using the Black-Scholes option pricing model with the following assumptions:

	2018
Expected volatility	68%
Expected term (years)	5.0-10.0
Risk free interest rate	2.6-3.1%
Expected dividend yield	0%
Exercise price	$ 16.00

Given the Company's common stock has been trading for a sufficient period of time, the Company utilizes a collection of volatilities of peer companies to estimate the expected volatility of its common stock. The expected term is calculated utilizing the simplified method.

The following table provides a summary of the incentive unit activity under the Incentive Plan. These amounts include incentive units granted to employees, directors and consultants.

	Units	Weighted Average Fair Value
Outstanding at December 31, 2016	3,066,734	$ 0.46
Granted	1,150,845	$ 0.46
Forfeited	(547,616)	$ 0.49
Outstanding at December 31, 2017	3,669,963	$ 0.46
Granted	1,715,368	$ 4.54
Forfeited	(34,982)	$ 4.85
Cancelled	(5,350,349)	$ 1.86
Outstanding at December 31, 2018	—	$ —

The following table provides a summary of the restricted stock grant activity under the Incentive Plan in 2018. These amounts include restricted stock granted to employees, directors and consultants.

	Shares	Weighted Average Grant Date Fair Value Per Share
Unvested restricted stock at December 31, 2017	—	$ —
Granted	1,264,360	$ 16.00
Vested	(144,283)	$ 16.00
Forfeited	(17,788)	$ 16.00
Unvested restricted stock at December 31, 2018	1,102,289	$ 16.00

The following table provides a summary of the stock option activity under the 2018 Plan in 2018. These amounts include stock options granted to employees, directors and consultants.

	Options	Weighted Average Fair Value
Outstanding at December 31, 2017	—	$ —
Granted	2,291,967	$ 9.88
Forfeited	(18,943)	$ 9.86
Outstanding at December 31, 2018	2,273,024	$ 9.88
Exercisable at December 31, 2018	420,087	$ 9.53

Included in the stock options granted in the table above are options to purchase 1,995,660 shares of common stock that were granted to employees, directors, and consultants granted at the time of the incentive unit conversion that have the same vesting terms as the profit units that were outstanding in September 2018 before the profit interests were converted into common stock. At the time of issuance of the stock options, 357,658 stock options to purchase shares of common stock became immediately vested, resulting in stock compensation expense of $3,627,507.

At December 31, 2018, there were 996,452 restricted shares under the Incentive Plan and 2,054,778 stock options under the 2018 Plan that vested and are expected to vest.

11. Income Taxes

The Company has had no income tax expense due to operating losses incurred for the years ended December 31, 2018 and 2017. The Company has also not recorded any income tax benefits for the net operating losses incurred in each period due to its uncertainty of realizing a benefit from those items. All of the Company's losses before income taxes were generated in the United States.

A reconciliation of the U.S. federal statutory income tax rate to the Company's effective income tax rate for the years ended December 31, 2018 and 2017 is as follows:

	2018	2017
Federal statutory rate	21.0%	34.0%
State taxes	—	—
Federal tax rate change	—	(30.0)%
Federal research tax credit	2.5%	2.7%
Stock compensation	(3.3)%	(0.3)%
Change in valuation allowance	(20.3)%	(6.3)%
Other	0.1%	(0.1)%
	0.0%	0.0%

Deferred income taxes represent the tax effect of transactions that are reported in different periods for financial and tax reporting purposes. Temporary differences and carryforwards that give rise to a significant portion of the deferred income tax benefits and liabilities are as follows at December 31, 2018 and 2017:

	2018	2017
Deferred income tax assets:		
Loss carryforwards	$ 12,236,973	$ 10,978,713
Deferred revenue	6,179,875	736,672
Tax credits	2,681,628	1,658,899
Stock compensation	1,084,096	
Other	181,734	65,714
Total deferred income tax assets	22,364,306	13,439,998
Deferred income tax liabilities		
Other	(35,345)	(24,079)
Property, equipment and leasehold improvements	(540,609)	(100,072)
Total deferred income tax liabilities	(575,954)	(124,151)
Less valuation allowance	(21,788,352)	(13,315,847)
Net deferred income tax assets	$ —	$ —

The Company has provided a valuation allowance against the full amount of the deferred tax assets since, in the opinion of management, based upon the earnings history of the Company, it is more likely than not that the benefits will not be realized. All or a portion of the remaining valuation allowance may be reduced in future years based on an assessment of earnings sufficient to utilize these potential tax benefits. The valuation allowance increased by $8.5 million in 2018 and $1.5 million in 2017 due to the increase in the net operating loss carryforwards and research and development tax credits, partially decreased by a reduction in deferred revenue.

The Company had approximately $58.3 million and $52.3 million of federal net operating loss carryforwards as of December 31, 2018 and 2017, respectively. Federal net operating loss carryforwards as of December 31, 2017 expire at various dates through fiscal year 2037 and federal net operating losses incurred in 2018 and in future years may be carried forward indefinitely, but the deductibility of such carryforwards is limited to 80% of the Company's taxable income in the year in which carryforwards are used. The Company had approximately $2.7 million and $1.7 million of federal tax credit carryforwards as of December 31, 2018 and 2017, respectively, which expire at various dates through fiscal year 2038.

In December 2017, the United States enacted the Tax Cuts and Jobs Act (the "Act"). The Act significantly changed U.S. corporate income tax laws by, among other provisions, reducing the maximum U.S. corporate income tax rate from 35% to 21% starting in 2018. During the year ended December 31, 2017, the Company reduced its deferred income tax asset by approximately $7.2 million as a result of the re-measurement of deferred tax assets and liabilities to the new lower statutory rate of 21%. The rate change did not result in an income tax expense as the effect of the rate change was offset by a corresponding change in the valuation allowance.

The Company complies with the provisions of ASC 740 in accounting for its uncertain tax positions. ASC 740 addresses the determination of whether tax benefits claimed or expected to be claimed on a tax return should be recorded in the financial statements. Under ASC 740, the Company may recognize the tax benefit from an uncertain tax position only if it is more likely that not that the tax position will be sustained on examination by the taxing authorities, based on the technical merits of the position.

The Company recognizes interest accrued related to unrecognized tax benefits and penalties in tax expense. The Company had no accruals for interest and penalties at December 31, 2018 and 2017.

The Company is required to file income tax returns in the U.S. Federal jurisdiction, and in the States of Connecticut and Massachusetts. The Company is a state franchise taxpayer in Connecticut and Massachusetts due to the Company's loss position. As a result, there is no state income tax provision included in the financial statements. The 2015 tax year forward remain subject to future examinations by the applicable taxing authorities.

For the years ended December 31, 2018 and 2017, the Company recorded a benefit from expected cash refunds to be provided by the State of Connecticut, equal to 65% of research and development credits, of $106,316 and $562,385, respectively, which is included in Other Income in the accompanying consolidated statement of operations and comprehensive loss, due to the Company being a state franchise taxpayer. The benefit results from the exchange of the state research and development tax credit carryforwards for cash refunds. At December 31, 2018 and 2017, the Company has recorded receivables of $1.1 million and $989,219, respectively, relating to research and development credits due to the Company.

12. Commitments and Contingencies

Lease Commitments

On December 31, 2017, the Company signed a new lease for its offices located in New Haven, Connecticut which added additional space through 2022. In addition, the Company has entered into various other equipment leases. Rental payments for the lease arrangements are payable in advance on a monthly basis. Rent expense totaled $606,538 and $402,897 for the years ended December 31, 2018 and 2017, respectively.

Future minimum annual lease payments are as follows:

2019	$	705,606
2020		731,541
2021		731,541
2022		716,906
Total	$	2,885,594

13. Net Loss Per Common Share/Unit

Basic and diluted loss per common share/unit were calculated as follows:

	2018	2017
Net loss	$ (41,480,466)	$ (24,049,206)
Change in redemption value of preferred units	(198,366,756)	(4,570,431)
Net loss attributable to common shares/units – basic and diluted	$ (239,847,222)	$ (28,619,637)
Weighted average number of common shares/units outstanding, basic and diluted	9,422,799	1,897,544
Net loss per common share/unit	$ (25.45)	$ (15.08)

The Company's potential dilutive securities have been excluded from the computation of diluted net loss per common share/unit as the effect would be to reduce the net loss per common share/unit. The following common share/unit equivalents have been excluded from the calculations of diluted loss per common share/unit because their inclusion would have been antidilutive.

	2018	2017
Redeemable preferred units, as if converted to common units	—	14,597,268
Incentive units	—	3,669,963
Stock options	2,273,024	—
Restricted stock awards	1,102,289	—
Preferred unit warrant	—	33,881
	3,375,313	18,301,112

14. Related Parties

Dr. Craig Crews, founder of the Company and the Chief Scientific Advisor to the Company, is a common shareholder in the Company and has a consulting agreement with the Company. The Company entered into an amendment to the amended and restated consulting agreement with Professor Crews, which became effective upon the closing of the IPO and continues in effect for three years. Pursuant to the amendment, Professor Crews will be paid $20,833 per month for his services. During the years ended December 31, 2018 and 2017, the Company paid Professor Crews $176,110 and $150,000, respectively, related to his consulting agreement. In connection with the conversion of incentive units, the Company also granted Professor Crews 235,150 options to purchase the Company's common stock at an exercise price of $16.00 per share, vesting over three years.

In July 2013, the Company entered into an exclusive license agreement, including the right to grant sublicenses, with Yale University, a common shareholder in the Company, to develop protein degradation technologies. The Company is required to pay Yale University a minimum annual License Maintenance Royalty of $75,000 until the first commercial sale of product. During the years ended December 31, 2018 and 2017, the Company paid the Office of Cooperative Research at Yale University, a common unit holder in the Company, $288,517 and $152,603, respectively, for the license maintenance royalty fee, reimbursable patent costs and sublicense fee (see Note 3).

In July 2016, the Company entered into a Corporate Sponsored Research Agreement (SRA) with Yale University, under the direction of Professor Crews, which was amended in April 2018. The amended SRA extended the agreement until April 2021 and amended the scope of work. The amended SRA requires quarterly payments of $250,000 through the end of the agreement. The total payments made under the SRA for 2018 and 2017 were $851,161 and $404,632, respectively.

15. Selected Quarterly Financial Data (Unaudited)

Selected quarterly financial data is as follows:

	Three months ended			
	March 31, 2017	June 30, 2017	September 30, 2017	December 31, 2017
Revenue	$ 1,668,861	$ 1,668,861	$ 1,668,861	$ 2,572,293
Operating expenses:				
Research and development	7,056,199	7,823,617	7,222,897	6,690,189
General and administrative	929,826	569,983	857,310	1,189,122
Total operating expenses	7,986,025	8,393,600	8,080,207	7,879,311
Loss from operations	(6,317,164)	(6,724,739)	(6,411,346)	(5,307,018)
Other income (expenses)				
Other income, net	264	159	607	553,129
Change in fair value of preferred unit warrant	1,335	1,457	1,546	1,533
Interest income	83,562	57,904	24,140	35,781
Interest expense	(13,713)	(12,973)	(12,219)	(11,451)
Total other income	71,448	46,547	14,074	578,992
Net loss	(6,245,716)	(6,678,192)	(6,397,272)	(4,728,026)
Change in redemption value of redeemable preferred units	—	—	—	(4,570,431)
Net loss attributable to common units	$(6,245,716)	$(6,678,192)	$(6,397,272)	$(9,298,457)
Net loss per common unit, basic and diluted	$ (3.29)	$ (3.52)	$ (3.37)	$ (4.90)
Weighted average common units outstanding, basic and diluted	1,897,544	1,897,544	1,897,544	1,897,544

	Three months ended			
	March 31, 2018	June 30, 2018	September 30, 2018	December 31, 2018
Revenue	$ 4,108,596	$ 3,399,895	$ 3,375,264	$ 3,440,165
Operating expenses:				
Research and development	7,143,817	10,337,835	13,149,879	14,562,299
General and administrative	1,246,887	1,579,605	4,284,231	5,821,445
Total operating expenses	8,390,704	11,917,440	17,434,110	20,383,744
Loss from operations	(4,282,108)	(8,517,545)	(14,058,846)	(16,943,579)
Other income (expenses)				
Other income, net	127,449	130,945	160,100	(315,764)
Change in fair value of preferred unit warrant	(196,295)	2,516	—	—
Interest income	211,237	539,413	523,338	1,196,113
Interest expense	(10,669)	(9,871)	(12,264)	(24,636)
Total other income	131,722	663,003	671,174	855,713
Net loss	(4,150,386)	(7,854,542)	(13,387,672)	(16,087,866)
Change in redemption value of redeemable preferred units	(71,482,098)	(14,834,049)	(112,050,609)	—
Net loss attributable to common shares/units	$(75,632,484)	$(22,688,591)	$(125,438,281)	$(16,087,866)
Net loss per common share/unit, basic and diluted	$ (39.86)	$ (11.96)	$ (62.38)	$ (0.52)
Weighted average common shares/units outstanding, basic and diluted	1,897,544	1,897,544	2,010,807	31,098,634

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