UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

Form 10-K

☒ **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**

Commission file number: 001-36066

PARATEK PHARMACEUTICALS, INC.

(Exact name of registrant as specified in its charter)

Delaware	**33-0960223**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**

75 Park Plaza
Boston, MA 02116
(617) 807-6600

(Address, including zip code, and telephone number, including area code, of registrant's principal executive office)

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

Title of each class	**Name of exchange on which registered**
Common Stock, par value $0.001 per share	**The Nasdaq Global Market**

Securities registered pursuant to Section 12(g) of the Act: None

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 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 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 Act). Yes ☐ No ☒

The aggregate market value of the common stock of the registrant held by non-affiliates of the registrant on June 30, 2018, the last business day of the registrant's second fiscal quarter was: $293,668,914.

As of February 28, 2019, there were 32,415,977 shares of the registrant's common stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive proxy statement for the registrant's 2019 Annual Meeting of Stockholders to be filed pursuant to Regulation 14A within 120 days of the registrant's year ended December 31, 2018 are incorporated herein by reference into Part III of this Annual Report on Form 10-K.

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Special Note Regarding Forward-Looking Statements

This Annual Report on Form 10-K contains forward-looking statements that are based upon current expectations within the meaning of the Private Securities Litigation Reform Act of 1995. Paratek Pharmaceuticals, Inc. intends that such statements be protected by the safe harbor created thereby. In some cases, you can identify forward-looking statements by terms such as "anticipate," "believe," "could," "estimate," "expect," "intend," "may," "plan," "potential," "predict," "project," "should," "will," "would" and similar expressions intended to identify forward-looking statements. Examples of such forward-looking statements include, but are not limited to, statements about or relating to:

- our intention to market NUZYRA™ as an empiric monotherapy that will be commercialized worldwide for the treatment of serious, community-acquired bacterial infections;
- our ability to successfully market, commercialize and achieve market acceptance for NUZYRA;
- the therapeutic and commercial potential of NUZYRA and SEYSARA™;
- proposed new products or developments, including additional indications for NUZYRA;
- our expectations regarding the potential benefits of the licensing, collaboration, partnership and other strategic arrangements and transactions we have entered into and may enter into in the future;
- our ability to establish and maintain potential new collaborative, partnering or other strategic arrangements for commercialization of our products and the development of our product candidates;
- our plans to pursue expansion of omadacycline to additional markets through collaboration or distribution arrangements;
- the timing, scope and anticipated initiation, enrollment and completion of our ongoing and planned clinical trials and any other future clinical trials that we or our development partners may conduct;
- the anticipated progress of our clinical programs, such as our Phase 2 program evaluating omadacycline for the treatment of urinary tract infections, including whether our ongoing clinical trials will achieve clinically relevant results;
- the timing of regulatory discussions and submissions, and the anticipated timing, scope and outcome of related regulatory actions or guidance;
- our ability to obtain, maintain and expand U.S. Food and Drug Administration, or FDA, and non-U.S. regulatory approvals of our products and product candidates;
- our ability to timely secure supply and manufacture conforming products;
- our ability to protect our intellectual property and operate our business without infringing upon the intellectual property rights of others;
- the plans, strategies and objectives of management for future operations;
- future economic conditions or performance;
- our expectations regarding the continued growth of our business operations due, in part, to the commercialization of NUZYRA;
- our estimates regarding the sufficiency of our cash resources, expenses, capital requirements and needs for additional financing, and our ability to obtain additional financing; and
- our projected financial performance.

Forward-looking statements are neither historical facts nor assurances of future performance. These statements involve known and unknown risks, uncertainties and other factors that may cause our actual results, levels of activity, performance, time frames or achievements to be materially different from the information set forth in these forward-looking statements. While we believe that we have a reasonable basis for each forward-looking statement, we caution you that these statements are based on a combination of facts and factors currently known by us and our projections of the future, about which we cannot be certain. We discuss many of these risks in the "Risk Factors" section and elsewhere in this Annual Report on Form 10-K. Given these risks, uncertainties and other factors, you should not place undue reliance on these forward-looking statements. Any of the events anticipated by the forward-looking statements may not occur or, if any of them do, the impact they will have on our business, results of operations and financial condition is uncertain. We hereby qualify all of our forward-looking statements by these cautionary statements.

Except as required by law, we assume no obligation to update these forward-looking statements publicly, or to update the reasons actual results could differ materially from those anticipated in these forward-looking statements, even if new information becomes available in the future.

PARATEK PHARMACEUTICALS™, PARATEK™ and NUZYRA™ are trademarks of Paratek Pharmaceuticals, Inc. SEYSARA™ is a U.S. trademark of Almirall, LLC. and a trademark of Paratek in foreign jurisdictions. Other trademarks referred to in this Annual Report on Form 10-K are the property of their respective owners. Solely for convenience, we only use the ™ symbol the first time any trademark is mentioned.

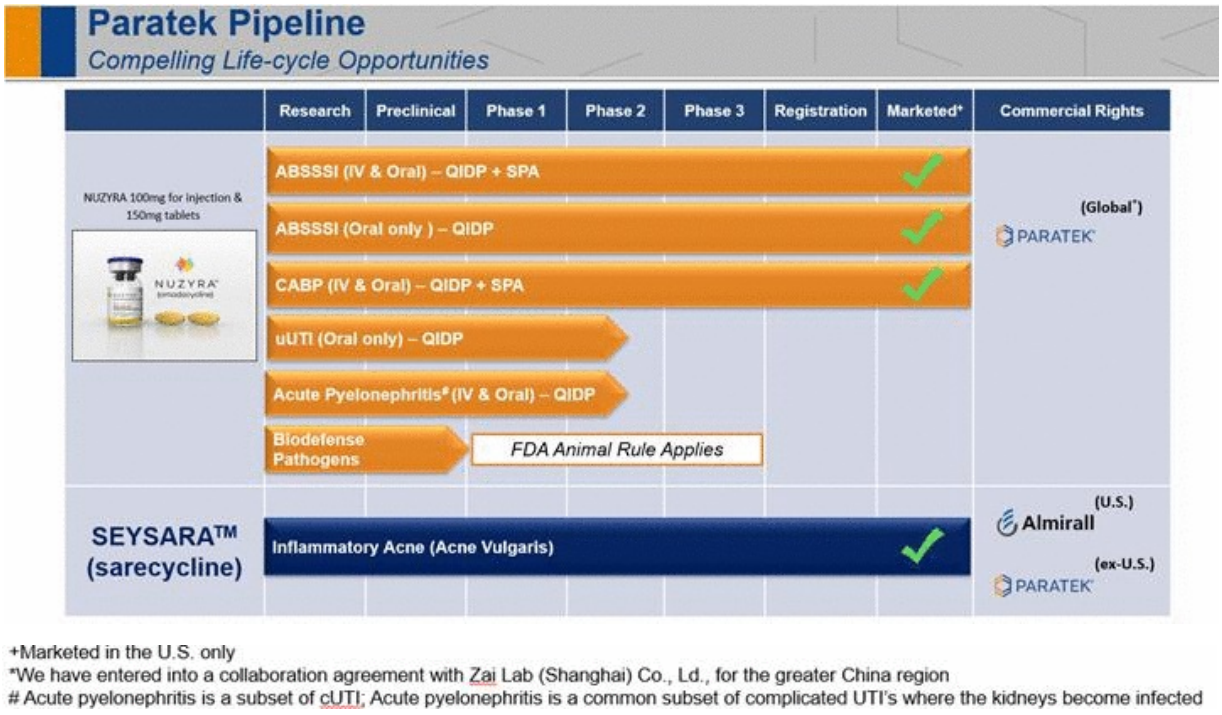
All references to "Paratek," "we," "us," "our" or the "Company" in this Annual Report on Form 10-K mean Paratek Pharmaceuticals, Inc. and its subsidiaries.

PART I

Item 1. Business

Overview

We are a commercial-stage biopharmaceutical company focused on the development and commercialization of innovative therapeutics. We have used our expertise in biology and tetracycline chemistry to create chemically diverse and biologically distinct small molecules derived from the minocycline core structure. Our United States Food and Drug Administration, or FDA, approved commercial product, NUZYRA™ (omadacycline) is a once-daily oral and intravenous antibiotic for the treatment of adult patients with community-acquired bacterial pneumonia, or CABP, and acute skin and skin structure infections, or ABSSSI, caused by susceptible pathogens. Paratek is also studying NUZYRA for the treatment of urinary tract infections, or UTI. SEYSARA™ (sarecycline) is an FDA-approved product with respect to which we have exclusively licensed in the United States certain rights to Almirall, LLC, or Almirall. SEYSARA is currently being marketed by Almirall in the United States, or U.S., as a new once-daily oral therapy for the treatment of moderate to severe acne vulgaris. Paratek retains development and commercialization rights with respect to sarecycline in the rest of the world.



NUZYRA

We believe that NUZYRA has the potential to become the primary choice of physicians for use as a broad-spectrum monotherapy antibiotic for ABSSSI, CABP, UTI and other serious community-acquired bacterial infections, where resistance is of concern. We believe NUZYRA will be used in the emergency room, hospital and community care settings. We have designed NUZYRA to provide potential advantages over existing antibiotics, including activity against resistant bacteria, broad-spectrum antibacterial activity, oral and IV formulations with once-daily dosing, no dosing adjustments for patients on concomitant medications and a generally safe and well tolerated profile.

To date, we have conducted more than 20 Phase 1 studies of omadacycline to characterize the effects of the drug on humans, including how it is absorbed, metabolized, and excreted. These Phase 1 studies also included evaluation in special populations like hepatic and renal failure patients. We have also conducted three successful Phase 3 clinical studies. Our first two Phase 3 clinical studies were for the treatment of ABSSSI (OASIS-1) and CABP (OPTIC). Both studies utilized initiation of IV therapy with transitions to oral-based treatment on clinical response. Our third Phase 3 clinical study (OASIS-2) was an oral-only administration of omadacycline in ABSSSI compared to oral-only linezolid. All three Phase 3 clinical studies resulted in omadacycline demonstrating positive efficacy results and a generally safe and well tolerated profile. These data formed the basis of approval for NUZYRA in the United States. In October 2018, we also submitted these data in the Market Authorization Applications, or MAA, submission to the European Medicines Agency, or the EMA.

Scientific advice received through the centralized procedure in Europe confirmed general agreement on the design and choice of comparators of the Phase 3 clinical program for ABSSSI and CABP and noted that approval based on a single study in each indication could be possible but would be subject to more stringent statistical standards than MAA programs that conduct two pivotal Phase 3 studies per indication. We believe that the inclusion of the second Phase 3 oral-only study in ABSSSI strengthens the data package for submission of an MAA filing for approval in European Union, or EU.

Based on the body of evidence and the activity of omadacycline against UTI pathogens, we initiated two Phase 2 clinical studies evaluating omadacycline for the treatment of UTI. The first study was initiated in December 2017 to evaluate the efficacy, safety, tolerability and pharmacokinetics of omadacycline in female patients with cystitis, a common uncomplicated UTI. The second study was initiated in November 2018 to evaluate the efficacy, safety, tolerability and pharmacokinetics of omadacycline in patients with acute pyelonephritis, a common complicated UTI. The results of the Phase 2 UTI program are expected in the second half of 2019.

In October 2016, we announced that we entered into a Cooperative Research and Development Agreement with the U.S. Army Medical Research Institute of Infectious Diseases to study omadacycline against pathogenic agents causing infectious diseases of public health and biodefense importance. These studies are designed to confirm humanized dosing regimens of omadacycline in order to study the efficacy of omadacycline against biodefense pathogens, including Yersinia pestis, or plague, and Bacillus anthracis, or anthrax. Funding support for the trial has been made available through the Defense Threat Reduction Agency, or DTRA/ Joint Science and Technology Office and Joint Program Executive Office for Chemical and Biological Defense / Joint Project Manager Medical Countermeasure Systems / BioDefense Therapeutics.

Sarecycline

Sarecycline, also known as SEYSARA in the United States, is a new, once-daily, tetracycline-derived compound designed for use in the treatment of acne and rosacea. We believe that, based upon the data generated to-date, sarecycline possesses favorable anti-inflammatory activity, narrow-spectrum antibacterial activity relative to other tetracycline-derived molecules, oral bioavailability, inability to cross the blood-brain barrier, and favorable pharmacokinetic properties. We believe that these qualities make sarecycline particularly well-suited for the treatment of inflammatory acne in the community setting. We have exclusively licensed U.S. development and commercialization rights to sarecycline for the treatment of acne to Allergan plc, or Allergan, who assigned such rights to Almirall, in August 2018. SEYSARA was approved by the FDA in October 2018 for the treatment of severe non-nodular inflammatory acne vulgaris in patients nine years of age and older. Almirall launched SEYSARA in the United States in January 2019. We retain development and commercialization rights with respect to sarecycline in the rest of the world.

Almirall currently holds a nonexclusive license to develop and commercialize sarecycline for the treatment of rosacea in the United States.

Corporate History

Merger of Novacea, Inc. and Transcept Pharmaceuticals, Inc.

We are a Delaware corporation that was incorporated in February 2001 as D-Novo Therapeutics, Inc., which later changed its corporate name to Novacea, Inc., or Novacea. Novacea previously traded on The Nasdaq Global Market under the ticker symbol “NOVC.” On January 30, 2009, Novacea completed a business combination with privately-held Transcept Pharmaceuticals, Inc., or Old Transcept, pursuant to which Old Transcept became a wholly-owned subsidiary of Novacea, and the corporate name of Novacea was changed to Transcept Pharmaceuticals, Inc., or Transcept. In connection with the closing of such transaction, Transcept common stock began trading on The Nasdaq Global Market under the ticker symbol “TSPT” on February 3, 2009.

Merger of Transcept Pharmaceuticals, Inc. and Paratek Pharmaceuticals, Inc.

On October 30, 2014, Transcept completed a business combination with privately-held Paratek Pharmaceuticals, Inc., or Old Paratek, in accordance with the terms of the Agreement and Plan of Merger and Reorganization, dated as of June 30, 2014, by and among Transcept, Tigris Merger Sub, Inc., or Merger Sub, Tigris Acquisition Sub, LLC, or Merger LLC, and Old Paratek, or the Merger Agreement, pursuant to which Merger Sub merged with and into Old Paratek, with Old Paratek surviving as a wholly-owned subsidiary of Transcept, followed by the merger of Old Paratek with and into Merger LLC, with Merger LLC surviving as a wholly-owned subsidiary of Transcept (we refer to these mergers together as the Merger). Immediately following the Merger, Transcept changed its name to "Paratek Pharmaceuticals, Inc.", and Merger LLC changed its name to "Paratek Pharma, LLC." In connection with the closing of the Merger, our common stock began trading on The Nasdaq Global Market under the ticker symbol "PRTK" on October 31, 2014.

The Antibiotics Market and Limitations of Current Therapies

Physicians commonly prescribe antibiotics to treat patients with acute and chronic infectious diseases that are either known, or presumed, to be caused by bacteria. The World Health Organization has identified the development of worldwide resistance to currently available antibacterial agents as being one of the three greatest threats to human health in this decade. In a press release announcing the release of a study titled "Hospital and Societal Costs of Antimicrobial Resistant Infections in a Chicago Teaching Hospital: Implications for Antibiotic Stewardship," it was estimated that antibiotic-resistant infections cost the U.S. healthcare system in excess of $20 billion annually. In addition, these infections result in more than $35 billion in societal costs and more than 8 million additional days spent in the hospital. Historically, the majority of life-threatening infections resulting from antibiotic-resistant bacteria were acquired in the hospital setting. According to AMR data from 2015 projected to 2028, approximately 6.7 million antibiotic treated events occur annually in the two combined indications of ABSSSI and CABP in U.S. hospitals. Furthermore, research conducted by Paratek suggests that in these same indications of ABSSSI and CABP there are approximately 890 thousand patients treated in U.S hospitals who fail to respond or are intolerant to the existing generic options. In the U.S. community setting, IMS NDTI data (2014-2015) projected to 2028 suggests there are approximately 23.7 million prescriptions for ABSSSI and CABP. Additionally, research conducted by Paratek suggests that approximately 2.1 million patients fail to respond or are intolerant to the existing oral generics in the U.S. community setting. The emergence of multi-drug resistant pathogens, coupled with limitations in terms of intolerance to existing generic options, emphasizes the need for novel agents capable of overcoming antibiotic resistance.

Bacteria are often broadly classified as gram-positive bacteria, including antibiotic-resistant bacteria such as methicillin-resistant Staphylococcus aureus, or MRSA, and multi-drug resistant Streptococcus pneumoniae, or MDR-SP; gram-negative bacteria, including antibiotic-resistant bacteria such as extended-spectrum beta-lactamases, or ESBL, producing *Enterobacteriaceae*; atypical bacteria, including *Chlamydophila pneumoniae* and *Legionella pneumophila*; and anaerobic bacteria, including *Bacteroides* and *Clostridia*. Antibiotics that are active against both gram-positive and gram-negative bacteria are referred to as "broad-spectrum", while antibiotics that are active only against a select subset of gram-positive or gram-negative bacteria are referred to as "narrow spectrum". Today, because many of the currently prescribed antibiotics that have activity against resistant organisms typically are "narrow spectrum," they cannot be used as an empiric monotherapy treatment of serious infections where gram-negative, atypical or anaerobic bacteria may also be involved. Empiric monotherapy refers to the use of a single, antibacterial agent to begin treatment of an infection before the specific pathogen causing the infection has been identified. We believe omadacycline will be used in the emergency room, hospital and community care settings. Based on studies published by the Cleveland Clinic Foundation, the National Institutes of Health, or NIH, and American Academy of Family Physicians, rates of infections involving organisms other than gram-positive bacteria have been found to be as much as 15% in ABSSSI, up to 40% in CABP and 70% to 90% in UTI.

When a patient goes to the emergency room or hospital for treatment of a serious infection, the physician's selection of which IV antibiotic to use is often based on the severity of infection, the pathogen(s) believed most likely to be involved and the probability of a resistant pathogen(s) being present. After initial IV therapy and once the infection begins to respond to treatment, hospitals and physicians face strong pressures to discharge patients from the hospital to reduce costs, limit hospital-acquired infections and improve the patient's quality of life. In order to transition patients out of the hospital and home to complete the course of therapy, physicians typically prefer to have the option to prescribe a bioequivalent oral formulation of the same antibiotic.

Antibiotics used to treat ABSSSI, CABP, UTI and other serious, community-acquired bacterial infections must satisfy a wide range of criteria on a cost-effective basis. For example, we believe that existing treatment options for ABSSSI, including vancomycin, linezolid, daptomycin, piperacillin tazobactam, oritavancin, dalbavancin, tigecycline and delafloxacin; for CABP, including levofloxacin, moxifloxacin, azithromycin, ceftriaxone, clarithromycin, ceftaroline and tigecycline; and for UTI, including levofloxacin, ciprofloxacin, and trimethoprim/sulfamethoxazole, have one or more of the following significant limitations:

- *Limited spectrum of antibacterial activity*. Since it may take as long as 48 to 72 hours to identify the pathogen(s) causing an infection and most of the currently available options that cover resistant pathogens are narrow-spectrum treatments, physicians frequently prescribe two or more antibiotics to treat a broad-spectrum of potential pathogens. For example, vancomycin, linezolid and daptomycin, the most frequently prescribed treatments for certain serious bacterial skin infections, are narrow-spectrum treatments active only against gram-positive bacteria. The currently available treatment with a more appropriate spectrum for use as a monotherapy against serious and antibiotic-resistant bacterial infections is tigecycline, but it has other significant limitations, most notably dose limiting tolerability of nausea and vomiting.

- *Lack of both oral and IV formulations*. The most common treatments for serious bacterial infections, vancomycin, daptomycin, ceftriaxone, piperacillin tazobactam, and tigecycline are only available as injectable or IV formulations. The lack of an effective bioequivalent oral formulation of these and many other commonly prescribed antibiotics requires continued IV therapy, which is inconvenient for the patient and may result in longer hospital stays and greater cost. Alternatively, because of the absence of the same antibiotic in an oral, well-tolerated formulation, physicians may switch the patient to a different orally available antibiotic at the time of hospital discharge. This carries the risk of new side effects and possible treatment failure if the oral antibiotic does not cover the same bacteria that were being effectively treated by the IV antibiotic therapy. While linezolid is a twice-daily IV and oral therapy, it is a narrow-spectrum treatment that is associated with increasing bacterial resistance, side effects from interactions with other therapies and other serious safety concerns.
- *Safety/tolerability concerns and side effects*. Concerns about antibiotic safety and tolerability are among the leading reasons why patients stop treatment and fail therapy. The most commonly used antibiotics, such as vancomycin, linezolid, daptomycin, levofloxacin, moxifloxacin, azithromycin, piperacillin/tazobactam and tigecycline, are associated with safety and tolerability concerns. For example, vancomycin, which requires frequent therapeutic monitoring of blood levels and corresponding dose adjustments, is associated with allergic reactions and can cause kidney damage, loss of balance, loss of hearing, vomiting and nausea in certain patients. Linezolid is associated with bone marrow suppression and loss of vision and should not be taken by patients who are also on many commonly prescribed anti-depressants, such as monoamine oxidase inhibitors and serotonin reuptake inhibitors. Daptomycin has been associated with a reduction of efficacy in patients with moderate renal insufficiency and has a side effect profile that includes muscle damage. Piperacillin/tazobactam is not used in patients with beta-lactam (penicillin) allergy while tigecycline is associated with tolerability concerns because of nausea and vomiting. Levofloxacin and moxifloxacin are associated with tendon rupture and peripheral neuropathy. In July 2016, the FDA approved changes to the labels of fluoroquinolone antibacterial drugs for systemic use (i.e., taken by mouth or by injection), stating "These medicines are associated with disabling and potentially permanent side effects of the tendons, muscles, joints, nerves, and central nervous system that can occur together in the same patient." As a result, the FDA revised the Boxed Warning, FDA's strongest warning, to address these serious safety issues. They also added a new warning and updated other parts of the drug label, including the patient Medication Guide. Additionally, a May 2012 article in the New England Journal of Medicine indicated that a small number of patients treated with azithromycin and quinolones, such as levofloxacin or moxifloxacin, may experience sudden death due to cardiac arrhythmia, which is often predicted by a prolongation of the corrected QT interval, or QTc. The FDA issued a Drug Safety Communication on March 12, 2013 titled "Azithromycin (Zithromax or Zmax) and the risk of potentially fatal heart rhythms," and the azithromycin drug label warnings were strengthened to address this concern.
- *Increasing bacterial resistance*. Bacterial resistance to the most frequently prescribed antibiotics (branded or generic) has limited their potential to treat infections, which often prevents their use as an empiric monotherapy. We believe that MRSA and MDR-SP, in the community have posed treatment challenges because of resistance to penicillins (resistance rate up to 100% for both), cephalosporins (100% and 11%, respectively, for ceftriaxone), macrolides (83% and 86%, respectively, for erythromycin/azithromycin) and quinolones (73% and 2%, respectively, for levofloxacin), particularly in ABSSSI and CABP. There have also been recent reports of resistance developing during treatment with daptomycin and concerns about an increasing frequency of strains of *Staphylococcus aureus* with reduced susceptibility to vancomycin. Additionally, linezolid use has been associated with drug resistance, including reports of outbreaks of resistance among *Staphylococcus aureus* and *Enterococcus strains*. The increasing occurrence of multi-drug resistant, ESBL-producing, gram-negative bacteria in community-acquired UTIs has severely curtailed the oral antibiotic treatment options available to physicians for these UTIs. For example, in a recent survey, 95% and 76% of the ESBL isolates of *Escherichia coli* found in UTIs were resistant to ceftriaxone and levofloxacin, respectively.

These limitations can ultimately lead to longer hospital stays, greater healthcare costs and increased morbidity and mortality due to lower cure rates and additional side effects. While certain antibiotics address some of these outcomes, we do not believe there is one superior treatment option that satisfies all outcomes. We believe that it is essential for the treatment of patients with serious, community-acquired bacterial infections that physicians prescribe the right antibiotic the first time, as ineffective antibiotics can quickly lead to progressively more severe and invasive infections or even death.

Attributes of NUZYRA

- *Equivalent Once-daily oral and IV formulations to support transition therapy*. We have studied once-daily IV and oral formulations of omadacycline in approximately 1,900 subjects to-date across multiple Phase 1, Phase 2 and Phase 3 clinical trials. The equivalent exposures of the oral and IV formulations permit transition therapy, which could allow patients to start treatment on the IV formulation in the hospital setting then "transition" to the oral formulation of the same bioequivalent antibacterial agent once the infection is responding enabling the patient to be released from the hospital to complete the full course of therapy at home. We believe that transition therapy has the potential to avoid the concerns that can accompany switching from an IV agent to a different class of oral antibiotic and to facilitate the continuance of curative therapy at home.

- *Broad-spectrum of antibacterial activity*. Omadacycline has demonstrated *in vitro* activity against all common pathogens found in ABSSSI, such as *Staphylococcus aureus*, including MRSA, *Streptococci* (including Group A *Streptococci*), anaerobic pathogens and many gram-negative organisms. Omadacycline is also active *in vitro* against the key pathogens found in CABP, such as Streptococcus pneumoniae, including MDR-SP, *Staphylococcus aureus, Haemophilus influenzae* and atypical bacteria, including *Legionella pneumophila*. On the basis of the *in vitro* spectrum of activity demonstrated by omadacycline against a range of pathogens in our pre-clinical testing, we believe omadacycline has the in vitro spectrum of coverage needed to potentially become the primary antibiotic choice of physicians and serve as an empiric monotherapy option for ABSSSI and CABP where resistance is of concern.
- *Generally safe and well tolerated profile*. To date, we have observed omadacycline to be generally well tolerated in studies involving approximately 1,900 subjects. We have conducted a thorough QTc study, as defined by FDA guidance to assess prolongation of QTc, an indicator of cardiac arrhythmia. This study suggests no prolongation of QTc by omadacycline at three times the therapeutic exposure. In addition, phase 3 clinical studies support that lack of cardiovascular effects associated with omadacycline. There have been no Adverse Events, or AEs, of ventricular arrhythmia, QT prolongation, seizures, syncope, or sudden death in the completed studies. Further, in clinical studies, omadacycline does not appear to adversely affect blood cell production, nor does it appear to metabolize in the liver or anywhere else in the body, thus reducing the likelihood of causing drug-to-drug interactions. Additionally, omadacycline has resulted in low rates of diarrhea, and we have not observed confirmed cases of *Clostridium difficile* infection, which can frequently occur from the use of other classes of broad-spectrum antibiotics such as beta-lactams and quinolones.
- *Designed to overcome bacterial resistance*. We designed omadacycline to overcome the two major mechanisms of tetracycline resistance, known as pump efflux and ribosome protection. This approach was via structure-activity relationship chemistry-based modifications of the seven and nine positions of minocycline. Our attempts to generate resistance to omadacycline in the laboratory suggest a low potential for developing resistance. In addition, our testing of thousands of bacterial samples in the laboratory suggests that omadacycline has not been affected to date by clinically relevant mechanisms of resistance to tetracyclines or to any other class of antibiotics.
- *Tissue penetration*. Omadacycline appears to penetrate tissues broadly, including lung, muscle, and kidney, thereby achieving high concentrations at the sites of infection. Since omadacycline is eliminated from the body (as unchanged parent compound) via the kidneys and intestine in an expected manner, based on the results of our Phase 1 studies, we believe it may potentially be used in patients with diminished kidney and liver function, without dose adjustment, and may potentially have benefit in patients receiving poly-pharmacy, where drug-drug interactions are of concern. We have completed pre-clinical work evaluating omadacycline for the potential treatment of sinusitis, also known as an acute sinus infection or rhinosinusitis. In addition, we have completed a proof-of-principle study in females with uncomplicated UTI, given the high percentage of renal elimination and urinary concentrations, omadacycline may have utility as a treatment option for patients with UTI infections.

Ongoing Omadacycline UTI Program

Key Pathogens—UTI

	N	MIC^{50}	MIC90	MIC RANGE
E. coli	2,581	0.5	2	0.12 to 32
K. pneumoniae	1,269	2	8	0.25 to >32
Enterobacter cloacae	264	2	2	0.25 to 32
*S. saprophyticus**	24	0.25	0.25	0.06 to 0.5
Enterococcus spp	665	0.12	0.25	0.03 to 2
P. aeruginosa	1,276	32	>32	0.12 to >32
Proteus spp.	221	8	16	1 to >32
S. aureus	2,684	0.12	0.25	0.003 to 4
S. pneumoniae	968	0.06	0.12	≤0.015 to 0.25

US and EU Surveillance 2017, JMI Laboratories
*US and EU Surveillance 2016-2017, JMI Laboratories

We conducted a Phase 1b proof-of-principle study last year that provides the evidence to continue to explore the development of omadacycline in UTI. The Phase 1b study results are highlighted below.

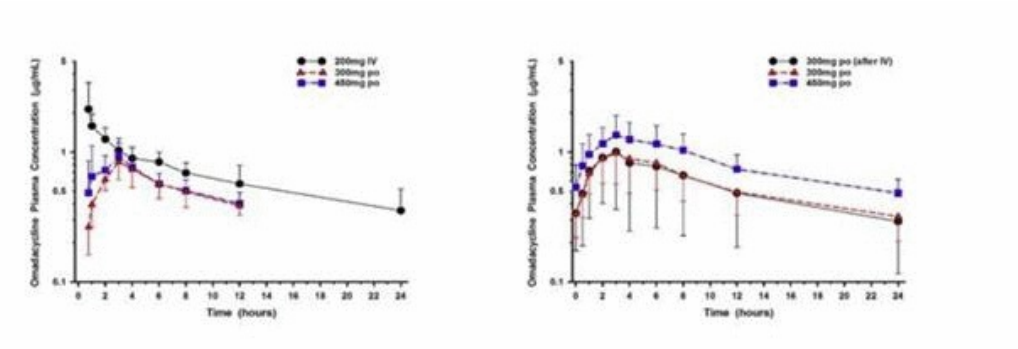
Phase 1 Clinical Study to Evaluate the Safety and Pharmacokinetics of Omadacycline in Female Adults with Cystitis (uncomplicated UTI):

Study Design. The primary objectives were to evaluate the urine and plasma concentrations of omadacycline. The secondary objectives were to evaluate the safety and efficacy of omadacycline in female adults with cystitis. This study was a randomized (1:1:1), open-label, parallel-designed Phase 1b study evaluating three dosing regimens of omadacycline in the treatment of female adults with cystitis. Following a Screening period of up to 48 hours, eligible subjects were randomly assigned to 1 of 3 groups and received dosing regimens of omadacycline. Dosing was as follows:

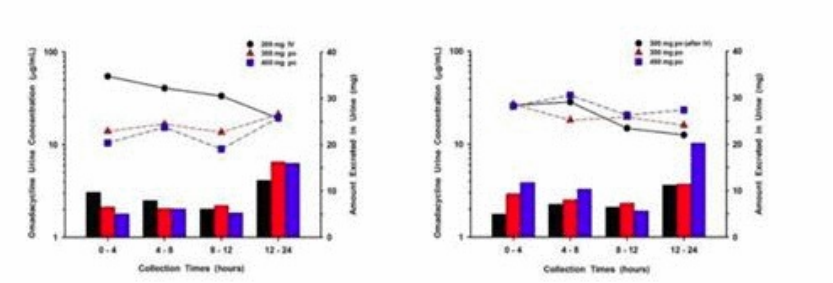
Dose Time	Study Day	Group 1 omadacycline IV Load, Oral Daily	Group 2 omadacycline Oral Load, Oral Daily	Group 3 omadacycline High oral Load, High oral Daily
t = 0 h	1	200 mg iv	300 mg po	450 mg po
t = 12 h	1	—	300 mg po	450 mg po
t = 24 h	2	300 mg po	300 mg po	450 mg po
t = 48 h	3	300 mg po	300 mg po	450 mg po
t = 72 h	4	300 mg po	300 mg po	450 mg po
t = 96 h	5	300 mg po	300 mg po	450 mg po

Study Results. Overall, 31 subjects (11 in Group 1 and 10 in each of Groups 2 and 3) were randomized and received the study drug at three study sites. All but one subject completed the intended five days of study treatment (1 subject in Group 1 withdrew consent). Subjects were females and they ranged in age from 19 to 75 years (mean 42 years overall). Plasma PK results on Day 1 showed the highest omadacycline exposure following the 200-mg IV dose in Group 1 (geometric mean $AUC_{0\text{-}24}$ 15557 h*ng/mL). The Day 1 geometric mean $AUC_{0\text{-}12}$ value for Group 2 was 6152 h*ng/mL (following the first 300 mg po dose) and, for Group 3, the value was 6686 h*ng/mL (following the first 450 mg po dose). By Day 5 the geometric mean $AUC_{0\text{-}24}$ values for Groups 1 and 2 were 9555 h*ng/mL and 12375 h*ng/mL, respectively following 300 mg po doses, and for Group 3 the value was 18693 h*ng/mL following the 450 mg po dose. At steady state (Day 5), the geometric mean cumulative amount of drug excreted in urine from time t0 to t24 (Ae0-24) values for Groups 1, 2, and 3 were 21.72 mg, 31.46 mg, and 43.60 mg, respectively. Relative to the absorbed amount of omadacycline, this corresponds to geometric mean fraction of the dose excreted unchanged in urine from 0 to 24 hours after dosing (Fe0-24) for Groups 1, 2, and 3 on Day 5 of 20.7%, 30.0%, and 27.7%, respectively. The highest mean omadacycline urine concentration value (65360 ng/mL [65.4 µg/mL]) was observed in Group 1 over 0 to 4 hours after the 200 mg IV dose on Day 1. The mean values across all other intervals/Groups ranged from 11699 to 48117 ng/mL (i.e., 11.7 to 48.1 µg/mL). The most common Treatment Emergent Adverse Events, or TEAEs, in all groups were gastrointestinal, most notably nausea (60% to 73% per group) and vomiting (20% to 40% per group), all of which were of mild or moderate intensity. No subjects in the study discontinued study treatment because of these TEAEs. No subjects in this study experienced severe TEAEs or serious adverse events, leading to premature discontinuation of the study drug.

Mean (± SD) Plasma Concentrations of Omadacycline Three Dose Levels on Days 1 (Left Panel) and 5 (Right Panel)

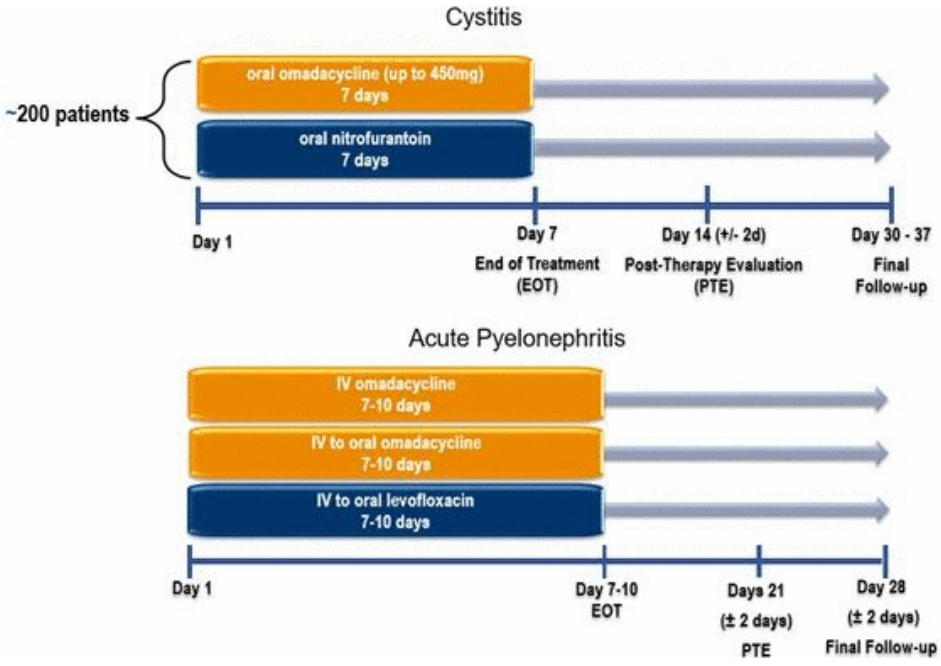


Mean (± SD) Urine Concentrations of Omadacycline Three Dose Levels on Days 1 (Left Panel) and 5 (Right Panel)



Study Conclusions. Omadacycline is partially excreted in urine in adult female subjects with cystitis. With the treatment regimens studied, observed urine concentrations of omadacycline compared favorably with minimum inhibitory concentration values for common UTI pathogens, and a high percentage of subjects achieved clinical success and favorable microbiological response. There was a higher than expected incidence of gastrointestinal, or GI, TEAEs (particularly nausea and vomiting), which contrasts with the notably lower rates of nausea and vomiting observed in other clinical studies using comparable dosing regimens. Omadacycline may be a useful treatment for certain UTIs and warrants evaluation in larger controlled studies, with continued close monitoring of GI tolerability.

Based on the above data results, we have initiated two Phase 2 clinical studies evaluating omadacycline for the treatment of UTI. The first study, which was initiated in December 2017, will evaluate the efficacy, safety, tolerability and pharmacokinetics of omadacycline in female patients with cystitis, a common uncomplicated UTI. The second study, which was initiated in November 2018, will evaluate the efficacy, safety, tolerability and pharmacokinetics of omadacycline in patients with acute pyelonephritis, a common complicated UTI. We plan to enroll approximately 200 patients in each study at multiple sites. The results of the Phase 2 UTI program are expected in the second half of 2019. The following illustration highlights the adaptive design we plan to employ in the cystitis and acute pyelonephritis studies.



Omadacycline Post-Approval Requirements in the United States

Under the Pediatric Research Equity Act (21 U.S.C. 355c), or PREA, all applications for new active ingredients are required to contain an assessment of the safety and effectiveness of the product for the claimed indication in pediatric patients unless this requirement is waived, deferred, or inapplicable. As part of the approval for NUZYRA, the FDA has waived the pediatric study requirement for ages 0 to < 8 years and deferred submission of pediatric studies for ages 8 to < 18 years. Specifically, the FDA has requested that we develop an age appropriate formulation, and complete three pediatric studies, including a pediatric PK study followed by safety and efficacy studies in pediatric patients with both CABP and ABSSSI. In addition to pediatric requirements, as with all antibiotic approvals, the FDA has also required a U.S. surveillance study for five years from the date of marketing to monitor for the development of resistance to NUZYRA (omadacycline) in those organisms specific to the indications in the label. Lastly, FDA has required a second study be conducted in patients with CABP.

Sarecycline

Sarecycline, also known as SEYSARA in the United States, is a novel, next generation, narrow spectrum tetracycline designed specifically for dermatological use. We exclusively licensed the U.S. rights to sarecycline for the treatment of acne to Allergan, who assigned such rights to Almirall, and Almirall is responsible for all U.S. development and commercialization costs for this program. In exchange for license rights, we have the right to receive (i) milestone payments upon the achievement of development and regulatory progress, and (ii) a royalty on net sales. We retain development and commercialization rights outside of the United States with respect to sarecycline, which are available for licensing to other partners in key international markets, such as the EU, Japan, the rest of Asia, Canada, and Latin America.

Allergan submitted an NDA to the FDA in the fourth quarter of 2017 for the treatment of moderate to severe acne. SEYSARA was approved in October 2018 by the FDA for the treatment of severe non-nodular inflammatory acne vulgaris in patients nine years of age and older. Almirall launched SEYSARA in the United States in January 2019. Under the Almirall Collaboration Agreement (as defined below), we have earned the following development and regulatory milestones: a $4.0 million milestone payment for the initiation of the Phase 3 acne vulgaris clinical studies in December 2014, a $5.0 million milestone payment for acceptance by the FDA of Allergan's NDA for sarecycline in December 2017, and a $12.0 million milestone payment for FDA approval in October 2018. Almirall is also obligated to pay us tiered royalties, ranging from the mid-single digits to the low-double digits, based on net sales of tetracycline compounds developed under the Almirall Collaboration Agreement, with a standard royalty reduction post patent expiration for such product for the remainder of the royalty term.

Almirall currently holds a nonexclusive license to develop and commercialize sarecycline for the treatment of rosacea in the United States.

Market

Both acne and rosacea can be disfiguring conditions with significant social and medical costs. According to IMS sales data, over $3.0 billion was spent on treatments for acne in 2013. In excess of $1.3 billion was spent in 2011 on various oral formulations of doxycycline or minocycline to treat these conditions. Periostat, reformulated doxycycline, and Solodyn, reformulated minocycline, recorded peak sales of approximately $300 million in 2012 and $750 million in 2011, respectively.

The most common oral treatments prescribed by dermatologists are generic tetracycline derivatives, which dermatologists widely accept as a therapy for moderate to severe acne post or in conjunction with topical treatment. A common side effect associated with the use of any broad-spectrum oral antibacterial agent is gastrointestinal upset and antibiotic-associated infections caused by the destruction of the normal bacterial flora. In addition, we believe there is a growing concern and awareness of the development of antibiotic-resistant bacteria from the heavy use of broader-spectrum antibiotics, such as these older-generation tetracyclines, where broad-spectrum antibacterial therapy is not necessary.

Therefore, we believe there is an unmet need for a narrow spectrum targeted tetracycline specifically designed for dermatologists to treat Acne such as, SEYSARA.

NUZYRA Commercialization Strategy

We currently intend to market NUZYRA as an empiric monotherapy that will be commercialized worldwide for the treatment of serious, community-acquired bacterial infections. We retain worldwide commercial rights to omadacycline, with the exception of the People's Republic of China, Hong Kong, Macau and Taiwan, where we have entered into a collaboration agreement with Zai Lab (Shanghai) Co., Ltd., or Zai. In the United States and Europe, we continue to reserve the right to either commercialize omadacycline alone, through one or more pharmaceutical companies that have established commercial capabilities, or some combination thereof.

In 2018 we entered into an arrangement with a third party to provide a contract field sales force of between 80-85 sales representatives with associated training and other services. In February 2019, we launched NUZYRA with 40 sales representatives calling on approximately 400 hospitals across the United States. By the end of 2019 we are planning to have a full complement of between 80-85 representatives calling on approximately 850 hospitals.

We believe that there is a similar rapidly growing need in other markets throughout the world, including Europe, established Asian markets such as Japan and Korea, and emerging markets, such as Russia, South America and India. We plan to pursue expansion of omadacycline to these markets through collaboration or distribution arrangements

Competition

Our potential competitors include large pharmaceutical and biotechnology companies, specialty pharmaceutical companies and generic drug companies. We believe that our product candidates offer key potential advantages over competitive products that could enable our product candidates to capture meaningful market share from our competitors.

NUZYRA competes with other antibiotics in the serious bacterial skin infection market. These include, but are not limited to, vancomycin, marketed as a generic by Abbott Laboratories and others; linezolid, marketed as Zyvox by Pfizer Inc. and available as a generic; daptomycin, marketed as Cubicin by Merck Pharmaceuticals, Inc. and available as a generic; dalbavancin, marketed as Dalvance by Allergan; tedizolid, marketed as Sivextro by Merck Pharmaceuticals, Inc.; oritavancin, marketed as Orbactiv by Melinta Therapeutics, Inc.; quinupristin/dalfopristin, marketed as Synercid by Pfizer, Inc.; tigecycline, marketed as Tygacil by Pfizer Inc. and available as a generic; telavancin, marketed as Vibativ by Theravance, Inc.; ceftaroline, marketed as Teflaro by Allergan; and generic trimethoprim/sulfamethoxazole and clindamycin.

Further, we expect that product candidates currently in review with the FDA, in Phase 3 clinical development, or that could enter Phase 3 clinical development in the near future, may represent significant competition if approved. These include, but are not limited to, delafloxacin for CABP, submitted for FDA review in October 2016 by Melinta Therapeutics, Inc.; CG-400549, under development by Crystal Genomics; GSK2140944, under development by GSK; nemonoxacin, under development by TaiGen Biotechnology; brilacidin, under development by Cellceutix; and radezolid, under development by Melinta Therapeutics, Inc.

NUZYRA also competes with other antibiotics in the community-acquired pneumonia market. These include azithromycin, marketed as Zithromax and Z-PAK by Pfizer Inc. and available as a generic; clarithromycin, marketed as Biaxin by Abbott Laboratories and available as a generic; moxifloxacin, marketed as Avelox by Bayer AG and available as a generic; levofloxacin, marketed as Levaquin by Johnson & Johnson and available as a generic; tigecycline, marketed as Tygacil by Pfizer Inc. and available as a generic; linezolid, marketed as Zyvox by Pfizer Inc. and available as a generic; ceftriaxone, marketed as Rocephin by F. Hoffman-La Roche Ltd and available as a generic; and ceftaroline, marketed as Teflaro by Allergan. We are also aware of various drugs that are or may eventually be under development for the treatment of CABP, delafloxacin and radezolid, under development by Melinta Therapeutics; solithromycin, under development by Melinta.; GSK2140944, under development by GSK; lefamulin, under development by Nabriva Therapeutics and nemanoxacin, under development by TaiGen Biotechnology.

A number of competitors exist in the potential UTI indication. Generic potential competitors include levofloxacin, ciprofloxacin, trimethoprim/sulfamethoxazole, ceftriaxone and amoxicillin/clavulanic acid. Several branded and generic injectable-only antibiotics are also used in hospitals, including imipenem/cilastatin, piperacillin/tazobactam, and gentamicin. A limited number of companies are developing new oral antibiotics for the treatment of UTI infections, finafloxacin by MerLion Pharmaceuticals and sulopenem by Iterum Therapeutics.

Many of our potential competitors have substantially greater financial, technical and human resources than we do, as well as greater experience in marketing products, discovering and developingt product candidates, obtaining FDA and other regulatory approvals of products and the commercialization of those products. Our competitors' drugs may be more effective, or more effectively marketed and sold, than our products or any other product candidate we may commercialize and may render our products or product candidates obsolete or non-competitive before we can recover the expenses of our development and commercialization. We anticipate that we will face intense and increasing competition as new drugs enter the market and advanced technologies become available. Finally, the development of new treatment methods for the diseases we are targeting could render our products or product candidates non-competitive or obsolete.

Manufacturing

We do not own or operate current Good Manufacturing Practices, or cGMP, manufacturing facilities for the production of any of our product candidates, nor do we have plans to develop our own manufacturing operations in the foreseeable future.. Our product candidates have to date been organic compounds of low molecular weight, commonly referred to as small molecules. They are manufactured in synthetic processes from starting materials that have to date been generally available.

For omadacycline, the manufacturing process has been refined to commercial scale. The active pharmaceutical ingredient manufacturing process is a three-step synthesis followed by purification and salt formation. The starting material is minocycline, which is a well characterized and readily available. In 2018, we completed three process validation batches each for the IV and oral formulations of omadacycline, which have subsequently been put on stability testing. We have entered into commercial supply agreements with qualified commercial manufacturing organizations as described below, to manufacture and supply the drug substance, drug product and finished packaged product.

CIPAN

In November 2016, we entered into a manufacturing and services agreement with CIPAN – Companhia Industrial Produtora de Antibióticos, or CIPAN. The agreement, as subsequently amended, provides the terms and conditions under which CIPAN will manufacture and supply to us increased quantities of minocycline starting material and crude omadacycline, or the CIPAN Products, for purification into omadacycline and, subsequently, for use in our products that contain omadacycline tosylate as the active pharmaceutical ingredient. Under this agreement, we are obligated to pay a CIPAN Product price in the four-digit U.S. dollar range per kilogram for minocycline starting material and in the four-digit or five-digit U.S. dollar range per kilogram for crude omadacycline, based on the annual volume of crude omadacycline that we order, subject to adjustments as set forth in the agreement. CIPAN will also perform certain services related to development, technology transfer and manufacturing of the CIPAN Products as provided in one or more statements of work, which shall set forth the fees payable by us to CIPAN for such services.

Our agreement with CIPAN will remain in effect for a fixed initial term, after which the agreement will continue, with respect to each CIPAN Product, for successive renewal terms unless either we or CIPAN have given written notice of termination within a certain period prior to the expiration of either the initial or then-current renewal term. The agreement may also be terminated under certain other circumstances, including by either party due to a material uncured breach by the other party or the other party's insolvency.

Carbogen

In December 2016, we entered into an outsourcing agreement with CARBOGEN AMCIS AG, or Carbogen. The agreement, as subsequently amended, provides for the terms and conditions under which Carbogen will manufacture and supply to us the active pharmaceutical ingredient for our omadacycline drug products in bulk quantities, or the Carbogen Product. Under this agreement, we are responsible for the cost and supply of crude omadacycline that Carbogen requires to manufacture the Carbogen Products and perform related services. We are obligated to pay Carbogen an amount in the seven-digit U.S. dollar range per batch of Carbogen Product that we order, depending on the size of the campaign, and the price may be adjusted in accordance with the terms of the agreement. We may also request that Carbogen perform certain services related to the Carbogen Product, for which we will pay reasonable compensation to Carbogen.

Our agreement with Carbogen will remain in effect for a fixed initial term and subsequent renewal terms. Both parties, however, are required to use diligent efforts to replace the existing agreement with a subsequent long-term agreement. We may terminate this agreement by delivering notice of termination to Carbogen prior to the expiration of the initial or subsequent term. The agreement may also be terminated under certain other circumstances, including by either party due to a material uncured breach by the other party or the other party's insolvency.

Almac

In December 2016, we entered into a manufacturing and services agreement with Almac Pharma Services Limited, or Almac. The agreement provides for the terms and conditions under which Almac will manufacture, package and supply to us omadacycline oral solid dosage tablets in bulk form, or the Almac Products. Under this agreement, we are required to use commercially reasonable efforts to timely provide Almac with the active pharmaceutical ingredient needed to manufacture the Almac Products and perform related services. We are obligated to pay a supply price in the five-digit range in Great Britain Pounds per batch of the Almac Products, subject to adjustments as provided in the agreement. We will also negotiate with Almac, as part of each individual scope of work, the reasonable costs for the services to be performed for us by Almac.

Our agreement with Almac will remain in effect for a fixed initial term, after which the agreement will continue for successive renewal terms unless either we or Almac have given written notice of termination within a certain period prior to the expiration of the initial or then-current renewal term. The agreement may also be terminated under certain other circumstances, including by either party due to a material uncured breach of the other party or the other party's insolvency.

Patheon

In July 2017, we entered into a master manufacturing services agreement and corresponding product agreement with Patheon UK Limited, or Patheon. The product agreement was amended in January 2019 to reflect exchange rate and pricing updates. The agreements provide for the terms and conditions under which Patheon will manufacture, package and supply to us, omadacycline in injectable form, or the Patheon Products. Under these agreements, we are required to deliver to Patheon the active pharmaceutical ingredient needed to manufacture the Patheon Products. We are obligated to pay a supply price in the six-digit dollar range per batch of the Patheon Products, subject to adjustments as provided in the agreements. Now that our omadacycline product has been approved, we are also subject to an annual minimum purchase requirement in the six-digit U.S. dollar range. If we desire for Patheon to conduct additional services other than those expressly set forth in the agreements, those would be subject to additional fees.

Our agreements with Patheon will remain in effect for a fixed initial term, after which they will continue for successive renewal terms unless either we or Patheon have given written notice of termination within a certain period prior to the expiration of the applicable initial or then-current renewal term. The agreements may also be terminated under certain other circumstances, including by either party due to a material uncured breach of the other party or the other party's insolvency.

Research and Development

We have and will continue to make substantial investments in research and development. Our research and development expenses totaled $57.5 million and $60.1 million in 2018 and 2017, respectively.

In the ordinary course of business, we enter into agreements with third parties, such as contract research organizations, medical institutions, clinical investigators and contract laboratories, to conduct our clinical studies and aspects of our research and preclinical testing. These third parties provide project management and monitoring services and regulatory consulting and investigative services.

Intellectual Property

The proprietary nature of, and protection for, our proprietary drug development platform, our product candidates and our discovery programs, processes and know-how are important to our business. We seek patent protection in the United States and internationally for areas such as composition of matter and the chemistries that allow for the synthesis of novel, substituted tetracycline compounds that exhibit significant antibacterial and/or anti-inflammatory activity, and any other technology to which we have rights, where available and when appropriate. Our policy is to pursue, maintain and defend patent rights, whether developed internally or licensed from third parties, and to protect the technology, inventions and improvements that are commercially important to the development of our business. We also rely on trade secrets that may be important to the development of our business.

Our commercial success will depend in part on obtaining and maintaining patent protection and trade secret protection of our proprietary technologies and compounds, our current product and future product candidates and the methods used to develop and manufacture them, as well as successfully defending these patents against third-party challenges. Our ability to prevent third parties from making, using, selling, offering to sell or importing our products and technology depends on the extent to which we have rights under valid and enforceable patents or trade secrets that cover these activities. We cannot be sure that patents will be granted with respect to any of our pending patent applications or with respect to any patent applications filed by us in the future, nor can we be sure that any of our existing patents or any patents that may be granted to us in the future will be commercially useful in protecting our technology.

As of December 31, 2018, our patent portfolio of owned or exclusively licensed patents and applications includes 68 issued U.S. patents, 23 pending U.S. patent applications and corresponding foreign national or regional counterpart patents or applications. We expect that the patents and patent applications in this portfolio, if issued, and if the appropriate maintenance, renewal, annuity or other government fees are paid, would expire between 2020 and 2038, excluding any additional terms from patent term adjustments or patent term extensions under the Hatch-Waxman Amendments.

NUZYRA (*omadacycline)*

The patent portfolio for omadacycline is directed to cover compositions of matter, formulations, salts and polymorphs, manufacturing methods, methods of use, dosing regimens, and modes of administration. The patents and patent applications covering omadacycline include patents and patent applications owned by us. In some corresponding foreign patents and patent applications, omadacycline is covered along with other compounds in patents and patent applications that are owned jointly by us and Tufts University, or Tufts, that are subject to a license agreement we have with Tufts. The issued composition of matter patent in the United States (U.S. Patent No. 7,553,828), if the appropriate maintenance, renewal, annuity, or other governmental fees are paid, was expected to expire in 2023, however, we believe that additional term for certain omadacycline patents may result from the patent term extension provision of the Hatch-Waxman Amendments of 1984, including the composition of matter patent which is anticipated to be extended until May 2028 and a method of use patent (U.S. 9,265,740) is expected to be extended until October 2030. Filings for both patent term extensions have been made with the U.S. Patent & Trademark Office. Omadacycline has received Qualified Infectious Disease Product, or QIDP, designation under the Generating Antibiotic Incentives Now Act, or the GAIN Act. This may provide up to an additional five years of market exclusivity layered with protection provided by the Hatch-Waxman Amendments, which GAIN also enables exclusivity to 2028. We expect that the other patents and patent applications in this portfolio, if issued, and if the appropriate maintenance, renewal, annuity or other governmental fees are paid, would expire between 2021 and 2038, excluding any additional terms from patent term adjustments or patent term extensions under the Hatch-Waxman Amendments.

SEYSARA (sarecycline)

The patent portfolio for our acne and rosacea program is directed to cover compositions of matter, methods of use, as well as salts and polymorphs of sarecycline. As of December 31, 2018, our patent portfolio includes issued U.S. Patent No. 8,318,706, or the ‘706 Patent, which covers composition of matter of sarecycline and issued U.S. Patent No. 8,513,223, or the ‘223 Patent, which covers methods of use for sarecycline, and corresponding foreign national or regional counterpart applications. The ‘706 Patent is expected to expire in 2032 (this expiry taking into account the expected patent term extension as provided by the Hatch-Waxman Amendments) and the ‘223 Patent is expected to expire in 2029, if the appropriate maintenance, renewal, annuity or other governmental fees are paid. Filing for the patent term extension has been made with the U.S. Patent & Trademark Office.

Intermezzo

As of December 31, 2018, our patent portfolio of owned or exclusively licensed patents and applications includes four issued U.S. patents directed to formulations and methods of use. The issued U.S. patents expire between 2025 and 2029.

Trade Secrets

In addition to patents, we rely on trade secrets and know-how to develop and maintain our competitive position. Trade secrets and know-how can be difficult to protect. We seek to protect our proprietary technology and processes, in part, by confidentiality agreements and invention assignment agreements with our employees, consultants, scientific advisors, contractors and commercial partners. These agreements are designed to protect our proprietary information and, in the case of the invention assignment agreements, to grant us ownership of technologies that are developed through a relationship with a third party. We also seek to preserve the integrity and confidentiality of our data, trade secrets and know-how by maintaining physical security of our premises and physical and electronic security of our information technology systems.

Trademarks

We have registered trademarks and service marks or pending trademark and services mark applications in a number of countries for PARATEK, PARATEK & HEXAGON DESIGN, PARATEK POSITIVE PATIENT STORIES, NUZYRA and its design logo, and other marks which we presently use or may use in connection with our pharmaceutical research and development as well as with our product candidates. SEYSARA is a trademark for which Almirall has applied for in the United States and for which Paratek has applied for in a number of foreign countries. In connection with the ongoing development and advancement of our products and services in the United States and in various international jurisdictions, we routinely seek to create protection for our marks and enhance their value by pursuing trademarks and service marks where available and when appropriate.

Collaborations and License Agreements

Our commercial strategy is to partner with established pharmaceutical companies to develop and market products for the larger community markets, while retaining certain rights to products aimed at concentrated markets, such as hospital-based products, where we may seek to participate in development and commercialization.

Zai Lab (Shanghai) Co., Ltd.

On April 21, 2017, Paratek Bermuda Ltd., a wholly-owned subsidiary of Paratek Pharmaceuticals, Inc., and Zai entered into a License and Collaboration Agreement, or the Zai Collaboration Agreement. Under the terms of the Zai Collaboration Agreement, Paratek Bermuda Ltd. granted Zai an exclusive license to develop, manufacture and commercialize omadacycline, or the licensed product, in the People's Republic of China, Hong Kong, Macau and Taiwan, or the Zai territory, for all human therapeutic and preventative uses other than biodefense. Zai will be responsible for the development, manufacturing and commercialization of the licensed product in the Zai territory, at its sole cost with certain assistance from Paratek Bermuda Ltd.

Under the terms of the Zai Collaboration Agreement, Paratek Bermuda Ltd. earned an upfront cash payment of $7.5 million in April 2017 and $5.0 million upon approval by the FDA of a New Drug Application, or NDA, submission in the CABP indication, which occurred on October 2, 2018. Paratek Bermuda Ltd. is eligible to receive up to $9.0 million in potential future regulatory milestone payments and $40.5 million in potential future commercial milestone payments, the next being $3.0 million upon submission of the first regulatory approval application for a licensed product in the People's Republic of China, or PRC. The terms of the Zai Collaboration Agreement also provide for Zai to pay Paratek Bermuda Ltd. tiered royalties at a low double digit to mid-teen percent on net sales of the licensed product in the Zai territory.

The Zai Collaboration Agreement will continue, on a region-by-region basis, until the expiration of and payment by Zai of all Zai's payment obligations, which is until the later of: (i) the abandonment, expiry or final determination of invalidity of the last valid claim within the Paratek patents that covers the licensed product in the region in the Zai territory in the manner that Zai or its affiliates or sublicensees exploit the licensed product or intend for the licensed product to be exploited; or (ii) the eleventh anniversary of the first commercial sale of such licensed product in such region.

Almirall, LLC

In July 2007, we and Warner Chilcott Company, Inc. (which became a part of Allergan), entered into a collaborative research and license agreement under which we granted Allergan an exclusive license to research, develop and commercialize tetracycline products for use in the United States for the treatment of acne and rosacea. In August 2018, Allergan assigned to Almirall, LLC, or Almirall, its rights under the collaboration agreement, or the Almirall Collaboration Agreement. Since Allergan did not exercise its development option with respect to the treatment of rosacea prior to initiation of a Phase 3 trial for the product, the license grant to Allergan, which was assigned to Almirall, converted to a non-exclusive license for the treatment of rosacea as of December 2014. Under the terms of the Almirall Collaboration Agreement, we and Almirall are responsible for, and are obligated to use, commercially reasonable efforts to conduct specified development activities for the treatment of acne and, if requested by Almirall, we may conduct certain additional development activities to the extent we determine in good faith that we have the necessary resources available for such activities. Almirall has agreed to reimburse us for its costs and expenses, including third-party costs, incurred in conducting any such development activities.

Under the terms of the Almirall Collaboration Agreement, Almirall is responsible for and is obligated to use commercially reasonable efforts to develop and commercialize tetracycline compounds that are specified in the agreement for the treatment of acne. We have agreed during the term of the Almirall Collaboration Agreement not to directly or indirectly develop or commercialize any tetracycline compounds in the United States for the treatment of acne, and Almirall has agreed during the term of the Almirall Collaboration Agreement not to directly or indirectly develop or commercialize any tetracycline compound included as part of the agreement for any use other than as provided in the Almirall Collaboration Agreement.

The Almirall Collaboration Agreement contains two performance obligations: (i) an exclusive license to research, develop and commercialize tetracycline products for use in the United States for the treatment of acne and rosacea and (ii) research and development services. The performance obligation to deliver the license was satisfied upon execution of the Almirall Collaboration Agreement in July 2007. All research and development services were completed by December 2010. The options provided to Almirall for additional development services do not provide Almirall with a material right as these services will not be provided at a significant or incremental discount. As such, the option services are not performance obligations.

We received an upfront fee in the amount of $4.0 million upon the execution of the Almirall Collaboration Agreement, $1.0 million upon filing of an Investigational NDA in 2010, $2.5 million upon initiation of Phase 2 trials in 2012 and $4.0 million upon initiation of Phase 3 trials associated with the Almirall Collaboration Agreement in December 2014.

In December 2017, the FDA's acceptance of the NDA for sarecycline was received, triggering a milestone payment of $5.0 million earned upon acceptance of an NDA for a product licensed under the Almirall Collaboration Agreement. As the performance obligation to deliver the license was satisfied in 2007 and research and development services completed by December 2010, all subsequent milestone payments are recognized as revenue when the risk of significant reversal is resolved, generally when the milestone event occurs. Therefore, the $5.0 million milestone payment was recognized in December 2017 and subsequently collected in the first quarter of 2018.

In October 2018, the FDA's regulatory approval of sarecycline, under the tradename SEYSARA, triggered the last milestone payment under the Almirall Collaboration Agreement of $12.0 million. Since FDA approval of SEYSARA was outside of the Company's control and not obtained until October 2, 2018, the achievement of the milestone was not deemed probable and the risk of significant reversal of revenue was not resolved until such time. Upon the FDA approval, the uncertainty related to this milestone was resolved and a significant reversal of revenue would not occur in future periods. As such, the $12.0 million milestone payment was recognized as revenue at the time of FDA approval. Almirall is also obligated to pay us tiered royalties, ranging from the mid-single digits to the low double digits, based on net sales of tetracycline compounds developed under the Almirall Collaboration Agreement, with a standard royalty reduction post patent expiration for such product for the remainder of the royalty term. Almirall's obligation to pay us royalties for each tetracycline compound it commercializes under the Almirall Collaboration Agreement expires on the later of the expiration of the last to expire patent that covers the tetracycline compound in the United States and the date on which generic drugs that compete with the tetracycline compound reach a certain threshold market share in the United States.

Either we or Almirall may terminate the Almirall Collaboration Agreement for certain specified reasons at any time after Almirall has commenced development of any tetracycline compound, including if Almirall determines that it would not be commercially viable to continue to develop or commercialize the tetracycline compound and/or that it is unlikely to obtain regulatory approval of the tetracycline compound, and, in any case, no backup tetracycline compound is in development or ready to be developed and the parties are unable to agree on an extension of the development program or an alternative course of action. Either we or Almirall may terminate the Almirall Collaboration Agreement for the other party's uncured breach of a material term of the agreement on 60 days' notice (unless the breach relates to a payment term, which requires a 30-day notice) or upon the bankruptcy of the other party that is not discharged within 60 days. Upon the termination of the Almirall Collaboration Agreement by Almirall for our breach, Almirall's license will continue following the effective date of termination, subject to the payment by Almirall of the applicable milestone and royalty payments specified in the agreement unless our breach was with respect to certain specified obligations, in which event the obligation of Almirall to pay us any further royalty or milestone payments will terminate. Upon the termination of the Almirall Collaboration Agreement by us for Almirall's breach or the voluntary termination of the agreement by Almirall, Almirall's license under the agreement will terminate.

Tufts University

In February 1997, we and Tufts entered into a license agreement under which we acquired an exclusive license to certain patent applications and other intellectual property of Tufts related to the drug resistance field to develop and commercialize products for the treatment or prevention of bacterial or microbial diseases or medical conditions in humans or animals or for agriculture. We subsequently entered into eleven amendments to that agreement, or collectively the Tufts License Agreement, to include patent applications filed after the effective date of the original license agreement, to exclusively license additional technology from Tufts, to expand the field of the agreement to include disinfectant applications, and to change the royalty rate and percentage of sublicense income paid by us to Tufts under sublicense agreements with specified sublicensees. We are obligated under the Tufts License Agreement to provide Tufts with annual diligence reports and a business plan and to meet certain other diligence milestones. We have the right to grant sublicenses of the licensed rights to third parties, which will be subject to the prior approval of Tufts unless the proposed sublicensee meets a certain net worth or market capitalization threshold. We are primarily responsible for the preparation, filing, prosecution and maintenance of all patent applications and patents covering the intellectual property licensed under the Tufts License Agreement at our sole expense. We have the first right, but not the obligation, to enforce the licensed intellectual property against infringement by third parties.

We issued Tufts 1,024 shares of our common stock on the date of execution of the original license agreement, and we may be required to make certain payments of up to $0.3 million to Tufts upon the achievement by products developed under the agreement of specified development and regulatory approval milestones. We have already made a payment of $50,000 to Tufts for achieving the first milestone following commencement of the Phase 3 clinical trial for omadacycline and a payment of $100,000 to Tufts for achieving the second milestone following our first marketing application (NDA) submitted in the United States. We are also obligated to pay Tufts a minimum royalty payment in the amount of $25,000 per year. In addition, we are obligated to pay Tufts royalties based on gross sales of products, as defined in the agreement, ranging in the low single digits depending on the applicable field of use for such product sale. If we enter into a sublicense under the Tufts License Agreement, based on the applicable field of use for such product, we will be obligated to pay Tufts (i) a percentage, ranging from 10% to 14% (ten percent to fourteen percent) for compounds other than omadacycline, and a percentage in the single digits for the compound omadacycline, of that portion of any sublicense issue fees or maintenance fees received by us that are reasonably attributable to the sublicense of the rights granted to us under the Tufts License Agreement and (ii) the lesser of (a) a percentage, ranging from the low tens to the high twenties based on the applicable field of use for such product, of the royalty payments made to us by the sublicensee or (b) the amount of royalty payments that would have been paid by us to Tufts if we had sold the products. We paid a sublicense issue fee in the low six figures to Tufts during the year ended December 31, 2017 upon earning the $7.5 million upfront payment under the Zai Collaboration Agreement.

Unless terminated earlier, the Tufts License Agreement will expire at the same time as the last-to-expire patent in the patent rights licensed to us under the agreement and after any such expiration we will continue to have an exclusive, fully-paid-up license to such intellectual property licensed from Tufts. Tufts has the right to terminate the agreement upon 30 days' notice should we fail to make a material payment under the Tufts License Agreement or commit a material breach of the agreement and not cure such failure or breach within such 30-day period, or if, after we have started to commercialize a product under the Tufts License Agreement, we cease to carry on its business for a period of 90 consecutive days. We have the right to terminate the Tufts License Agreement at any time upon 180 days' notice. Tufts has the right to convert our exclusive license to a non-exclusive license if we do not commercialize a product licensed under the agreement within a specified time period.

Purdue Pharma L.P.

In July 2009, we and Purdue Pharma L.P., or Purdue Pharma, entered into a collaboration agreement, or the Purdue Collaboration Agreement, which granted an exclusive license to Purdue Pharma to commercialize Intermezzo in the United States in exchange for a non-refundable license fee, certain milestone payments and tiered royalties on net sales of Intermezzo.

In December 2013, Purdue Pharma notified us that it intended to discontinue use of the Purdue Pharma sales force to actively market Intermezzo to healthcare professionals during the first quarter of 2014.

In October 2014, we announced that our Board of Directors had approved a special dividend of, among other things, the right to receive, on a pro rata basis, 100% of any royalty income received by us pursuant to the Purdue Collaboration Agreement and 90% of any cash proceeds from a sale or disposition of Intermezzo, less fees and expenses incurred in connection with such activity, to the extent that either occurred prior to the second anniversary of the closing date of the Merger. On October 28, 2016, in satisfaction of our payment obligation of the proceeds of sale or disposition of the Intermezzo assets to the former Transcept stockholders under the Merger Agreement, we executed a royalty sharing agreement, or the Royalty Sharing Agreement, with the Special Committee of the Company's Board of Directors, or the Special Committee, a committee established in connection with the Merger. Under the Royalty Sharing Agreement, we agreed to pay to the former Transcept stockholders 50% of all royalty income received by us pursuant to the Purdue Collaboration Agreement, net of all costs, fees and expenses incurred by us in connection with the Purdue Collaboration Agreement, related agreements, the Intermezzo product and the administration of the royalty income to the Transcept stockholders. The NDA for Intermezzo was then withdrawn from the FDA by Purdue Pharma as of December 31, 2018 and further sales of the drug are not planned. Neither us nor the former shareholders of Transcept will receive future cash payments pursuant to the Royalty Sharing Agreement. As such, we wrote off the remaining balance of the Intermezzo product rights during the fourth quarter of 2018.

U.S. Army Medical Research Institute of Infectious Diseases

In October 2016, we announced that we entered into a Cooperative Research and Development Agreement with the U.S. Army Medical Research Institute of Infectious Diseases to study omadacycline against pathogenic agents causing infectious diseases of public health and biodefense importance. These studies are designed to confirm humanized dosing regimens of omadacycline in order to study the efficacy of omadacycline against biodefense pathogens, including Yersinia pestis, or plague, and Bacillus anthracis, or anthrax. Funding support for the trial has been made available through the Defense Threat Reduction Agency, or DTRA/ Joint Science and Technology Office and Joint Program Executive Office for Chemical and Biological Defense / Joint Project Manager Medical Countermeasure Systems / BioDefense Therapeutics.

Past Collaborations

Novartis International Pharmaceutical Ltd.

In September 2009, we and Novartis International Pharmaceutical Ltd., or Novartis, entered into a Collaborative Development, Manufacture and Commercialization License Agreement, or the Novartis Agreement, which provided Novartis with a global, exclusive patent and technology license for the development, manufacturing and marketing of omadacycline. The Novartis Agreement was terminated by Novartis without cause in June 2011 and the termination was effective 60 days later. We and Novartis subsequently entered into a letter agreement in January 2012, or the Novartis Letter Agreement, as amended, pursuant to which we reconciled shared development costs and expenses and granted Novartis a right of first negotiation with respect to commercialization rights of omadacycline following approval of omadacycline from the FDA, EMA, or any regulatory agency, but only to the extent we had not previously granted such commercialization rights related to omadacycline to another third party as of any such approval. We also agreed to pay Novartis a 0.25% royalty, to be paid from net sales received by us in any country following the launch of omadacycline in that country and continuing until the later of expiration of the last active valid patent claim covering such product in the country of sale and 10 years from the date of first commercial sale in such country. The amended Novartis Letter Agreement resulted in a long-term liability in the amount of $3.6 million as of December 31, 2018 and 2017 included within "Other Long-Term Liabilities" on our consolidated balance sheet. There are no other payment obligations to Novartis under the Novartis Agreement or the amended Novartis Letter Agreement.

Government Regulation

Government authorities in the United States, at the federal, state and local level, and other countries extensively regulate, among other things, the research, development, testing, manufacture, labeling, packaging, advertising, promotion, storage, distribution, and export and import of our products. The process of obtaining regulatory approvals and the subsequent compliance with applicable federal, state, local and foreign statutes and regulation require the expenditure of substantial time and financial resources.

U.S. Government Regulation

NDA Approval Processes

In the United States, the FDA regulates drugs under the Federal Food, Drug and Cosmetic Act, or the FDCA, and implementing regulations. The process of obtaining regulatory approvals and the subsequent compliance with applicable federal, state, local and foreign statutes and regulation require the expenditure of substantial time and financial resources. Failure to comply with the FDCA and other applicable U.S. requirements at any time during the product development process, approval process or after approval may subject us to a variety of administrative or judicial sanctions, any of which could have a material adverse effect on us. These sanctions could include:

- refusal to approve pending applications;
- withdrawal of an approval;
- imposition of a clinical hold;
- warning letters, untitled letters and similar communications;
- product seizures or recalls;
- total or partial suspension of production or distribution; or
- injunctions, fines, restitution, disgorgement of profits or civil or criminal investigations and penalties brought by the FDA and the Department of Justice, or DOJ, or other governmental entities.

The process required by the FDA before a drug may be marketed in the United States generally involves the following:

- completion of preclinical laboratory tests, animal studies and formulation studies conducted according to Good Laboratory Practices or other applicable regulations;
- submission to the FDA of an Investigational New Drug, or IND, application, 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 proposed drug for its intended use, conducted in accordance with current Good Clinical Practices, or cGCP, which are ethical and scientific quality standards and FDA requirements for conducting, recording and reporting clinical trials to assure that the rights, safety and well-being of trial participants are protected;
- preparation and submission to the FDA of an NDA;
- satisfactory completion of one or more FDA inspections of the manufacturing facility or facilities at which the product is produced to assess compliance with cGMP, requirements to assure that the facilities, methods and controls are adequate to preserve the drug's safety, identity, strength, quality and purity; and
- FDA review and approval of the NDA.

Once a pharmaceutical candidate is identified for development, it enters the preclinical testing stage. Preclinical tests include laboratory evaluations of product chemistry, toxicity and formulation, as well as animal studies. An IND sponsor must submit the results of the preclinical tests, together with manufacturing information and analytical data, to the FDA as part of the IND. Some preclinical or nonclinical testing may continue even after the IND is submitted. In addition to including the results of the preclinical studies, the IND will also include a protocol detailing, among other things, the objectives of the clinical trial, the parameters to be used in monitoring safety and the effectiveness criteria to be evaluated if the first phase lends itself to an efficacy determination. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA, within the 30-day time period, places the IND on clinical hold. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before clinical trials can begin. A clinical hold may occur at any time during the life of an IND and may affect one or more specific studies or all studies conducted under the IND.

All clinical trials must be conducted under the supervision of one or more qualified investigators in accordance with cGCP. They must be conducted under protocols detailing the objectives of the trial, dosing procedures, subject selection and exclusion criteria and the safety and effectiveness criteria to be evaluated. Each protocol and any amendments must be submitted to the FDA as part of the IND, and progress reports detailing the results of the clinical trials must be submitted at least annually to the FDA and more frequently in other situations, including the occurrence of serious adverse events. An IRB at each institution participating in the clinical trial must review and approve the protocol and any amendments before a clinical trial commences or continues at that institution, approve the information regarding the clinical trial and the informed consent form that must be provided to each trial subject or his or her legal representative, monitor the study until completed and otherwise comply with IRB regulations. Information about certain clinical trials must be submitted within specific timeframes to the NIH for public dissemination on their ClinicalTrials.gov website.

Human clinical trials are typically conducted in three sequential phases that may overlap or be combined:

- *Phase 1.* The drug is initially introduced into healthy human subjects and tested for safety, dosage tolerance, absorption, metabolism, distribution and elimination. In the case of some products for severe or life-threatening diseases, such as cancer, especially when the product may be inherently too toxic to ethically administer to healthy volunteers, the initial human testing is often conducted in patients with the target disease or condition.
- *Phase 2.* Clinical trials are initiated in a limited patient population intended to identify possible adverse effects and safety risks, to preliminarily evaluate the efficacy of the product for specific targeted diseases and to determine dosage tolerance and optimal dosage.
- *Phase 3.* Clinical trials are undertaken to further evaluate dosage, clinical efficacy and safety in an expanded patient population at geographically dispersed clinical study sites. These studies are intended to establish the overall risk-benefit ratio of the product and provide an adequate basis for regulatory approval and product labeling.

Phase 1, Phase 2 and Phase 3 testing may not be completed successfully within any specified period, if at all. The FDA or the sponsor may suspend or terminate a clinical trial at any time for a variety of reasons, including a finding that the research subjects or patients are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution if the clinical trial is not being conducted in accordance with the IRB's requirements or if the drug has been associated with unexpected serious harm to patients.

During the development of a new drug, sponsors are given opportunities to meet with the FDA at certain points, including prior to submission of an IND, at the end of Phase 2 and before an NDA is submitted. Meetings at other times may also be requested. These meetings can provide an opportunity for the sponsor to share information about the data gathered to date, for the FDA to provide advice and for the sponsor and the FDA to reach agreement on the next phase of development. Sponsors typically use the End-of-Phase 2 meeting to discuss their Phase 2 clinical results and present their plans for the pivotal Phase 3 clinical trial or trials that they believe will support approval of the new drug. If this type of discussion occurred, a sponsor may be able to request a special protocol assessment, or SPA, agreement, a voluntary process the purpose of which is to reach agreement with the FDA on the design of a Phase 3 clinical trial protocol and analysis that will form the primary basis of an efficacy claim.

According to FDA guidance for industry on the SPA agreement process, a sponsor that meets the prerequisites may make a specific request for a SPA and must provide information necessary for discussion and agreement on the design and size of the proposed clinical trial. The FDA has a goal of evaluating the protocol within 45 days of the request to assess whether the proposed trial is adequate, and that evaluation may result in discussions and/or requests for additional information. An SPA agreement request must be made before the proposed clinical trial begins. If an agreement is reached, it will be documented in writing and made part of the record. The agreement may not be changed by the sponsor or the FDA after the trial begins, except with the written agreement of the sponsor and the FDA or if the FDA determines that a substantial scientific issue essential to determining the safety or efficacy of the drug was identified after the testing began. Also, if the sponsor makes any unilateral changes to the approved protocol, the agreement will be invalidated. A SPA agreement is intended to provide greater assurance that if the agreed upon clinical trial protocols are followed, the clinical trial endpoints are achieved, and there is a favorable risk-benefit profile, the data may serve as the primary basis for an efficacy claim in support of NDA approval. However, SPA agreements are not a guarantee of an approval of a product candidate or any permissible claims about the product candidate, and final determinations of approvability will not be made until the FDA completes its review of the entire NDA.

The Pediatric Research Equity Act, or PREA, requires a sponsor to conduct pediatric studies for certain drugs and biologics. Specifically, PREA requires original NDAs, biologic license applications, or BLAs, and supplements thereto for a new active ingredient, new indication, new dosage form, new dosing regimen or new route of administration to contain a pediatric assessment unless the sponsor has received a deferral or waiver. The FDA has waived the pediatric study requirement for ages 0 to < 8 years because there is nonclinical evidence strongly suggesting that omadacycline would be unsafe in this pediatric group due to the risk of tetracycline-associated tooth discoloration and enamel hypoplasia, and the risk of tetracycline-associated inhibition of bone growth. The FDA has deferred submission of pediatric studies for ages 8 to < 18 (ABSSSI until 2024 and CABP until 2026) years because the product was ready for approval for use in adults.

Concurrent with clinical trials, companies usually complete additional animal safety studies and must also develop additional information about the chemistry and physical characteristics of the drug and finalize a process for manufacturing the product in accordance with cGMP requirements. The manufacturing process must be capable of consistently producing quality batches of the drug candidate and the manufacturer must develop methods for testing the quality, purity and potency of the final drugs. 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.

The results of product development, preclinical studies and clinical trials, along with descriptions of the manufacturing process, analytical tests conducted on the chemistry of the drug, proposed labeling and other relevant information are submitted to the FDA as part of a NDA requesting approval to market the product for one or more indications. The submission of a NDA is subject to the payment of user fees, but a waiver of such fees may be obtained under specified circumstances. The FDA reviews all NDAs submitted to ensure that they are sufficiently complete for substantive review before it accepts them for filing. It may request additional information rather than accept a NDA for filing. In this event, the NDA must be resubmitted with the additional information. The resubmitted application also is subject to review before the FDA accepts it for filing.

Once the submission is accepted for filing, the FDA begins an in-depth review. NDAs receive either standard or priority review. A drug representing a significant improvement in the safety or effectiveness of the treatment, prevention or diagnosis of a serious disease or condition may receive priority 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 FDA accepts the NDA 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 drugs that are not NMEs, the ten-month and six-month review periods run from the date that FDA receives the application. The review process may be extended by the FDA for three additional months to consider a major amendment to the application following the original submission.

The FDA reviews an NDA to determine, among other things, whether a product is safe and effective for its intended use and whether its manufacturing complies with cGMP requirements to assure and preserve the product's safety, identity, strength, quality and purity. The FDA may refer the NDA to an advisory committee for review and recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendation of an advisory committee, but it generally follows such recommendation.

Before approving an NDA, the FDA will typically inspect the facility or facilities where the product is manufactured and tested. These pre-approval inspections may cover all facilities associated with NDA submission, including drug component manufacturing (such as active pharmaceutical ingredients), finished drug product manufacturing, and control testing laboratories. Additionally, before approving an NDA, the FDA will typically inspect one or more clinical sites to assure compliance with cGCP. In addition, the FDA may require, as a condition of approval, Risk Evaluation and Mitigation Strategies, or REMS, restricted distribution and use, enhanced labeling, special packaging or labeling, expedited reporting of certain adverse events, pre-approval of promotional materials, restrictions on direct-to-consumer advertising or commitments to conduct additional research post-approval.

On the basis of the FDA's evaluation of the NDA and accompanying information, 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. If the FDA ultimately decides that the NDA does not satisfy the criteria for approval, the FDA will issue a complete response letter to indicate that the agency will not approve the NDA in its present form. The complete response letter usually describes all of the specific deficiencies in the NDA identified by the FDA. If a complete response letter is issued, the applicant may either resubmit the NDA, addressing all of the deficiencies identified in the letter, or withdraw the application.

Expedited Review and Approval

The FDA has various programs, including Fast Track and priority review, which are intended to expedite or simplify the process for reviewing drugs. Even if a drug qualifies for one or more of these programs, the FDA may later decide that the drug no longer meets the conditions for qualification or that the time period for FDA review or approval will not be shortened. Generally, drugs that may be eligible for these programs are those for serious or life-threatening conditions, those with the potential to address unmet medical needs and those that offer meaningful benefits over existing treatments. For example, Fast Track is a process designed to facilitate the development and expedite the review of drugs to treat serious diseases with the potential, based on nonclinical or clinical data, to fill an unmet medical need. Priority review is designed to give drugs that offer a significant improvement in safety or effectiveness of treatment for a serious condition an expedited review within eight months from the completed submission (six months from filing) as compared to a standard review time of twelve months from the completed submission (10 months from filing) for a standard new molecular entity NDA. Although Fast Track and priority review do not affect the standards for approval, the FDA will attempt to facilitate early and frequent meetings with a sponsor of a Fast Track-designated drug and expedite review of the application for a drug designated for priority review.

The GAIN Act is intended to provide incentives for the development of new QIDPs. A new drug that is designated as a QIDP after a request by the sponsor that is made before an NDA is submitted will be eligible, if approved, for an additional five years of exclusivity beyond any period of exclusivity to which it would have previously been eligible. In addition, a QIDP will receive priority review and qualify for a Fast Track designation. QIDPs are defined as antibacterial or antifungal drugs intended to treat serious or life-threatening infections, including those caused by an antibacterial or antifungal resistant pathogen or qualifying pathogens identified by the FDA. Examples of pathogens that may be designated as a qualifying pathogen include MRSA, vancomycin-resistant *Enterococcus* and multi-drug resistant gram-negative bacteria. Omadacycline (both IV and oral formulations) has been designated as a QIDP for complicated UTI, ABSSSI and CABP.

Beyond GAIN Act

In addition to the GAIN Act, the 21st Century Cures Act, signed into law in December 2016, established a new FDA limited population pathway for antimicrobial drugs that treat serious or life-threatening infections for which there are unmet medical needs. The United States Congress has initiated a significant number of other legislative proposals in recent years to provide further incentives in anti-infective development. For example, in December 2018, the Developing an Innovative Strategy for Antimicrobial Resistant Microorganisms Act of 2018, or DISARM Act, was introduced in the Senate to incentivize the research and development of advanced antibiotics through certain reimbursement-related incentives. It is possible that these or other proposals related to anti-infective development may be enacted into law in the future. We cannot predict whether or what legislative changes will be enacted or how they may impact our business and our products.

Patent Term Restoration and Data Exclusivity

Depending upon the timing, duration and specifics of FDA approval of the use of our drugs, some of our U.S. patents may be eligible for limited patent term extension under the Hatch-Waxman Amendments. The Hatch-Waxman Amendments permit a patent restoration term of up to five years for a single patent for an approved product as compensation for patent term lost during product development and the FDA regulatory review process. However, patent term restoration cannot extend the remaining term of a patent beyond a total of 14 years from the product's approval date. We have applied for restoration of patent term for NUZYRA and SEYSARA, as detailed in the Intellectual Property Section.

Data exclusivity provisions under the FDCA also can delay the submission or the approval of certain applications. The FDCA provides a five-year period of non-patent data exclusivity within the United States to the first applicant to gain approval of an NDA for a new chemical entity. A drug is a new chemical entity if the FDA has not previously approved any other new drug containing the same active moiety, which is the molecule or ion responsible for the action of the drug substance. During the exclusivity period, the FDA may not accept for review an Abbreviated New Drug Application, or ANDA, or a 505(b)(2) NDA submitted by another company using the drug entitled to data exclusivity as the reference listed drug, or RLD. However, an application may be submitted after four years if it contains a certification of patent invalidity or non-infringement. The FDCA also provides three years of data exclusivity for an NDA, 505(b)(2) NDA or supplement to an existing NDA if new clinical investigations, other than bioavailability studies, that were conducted or sponsored by the applicant are deemed by the FDA to be essential to the approval of the application, for example, for new indications, dosages or strengths of an existing drug. This three-year exclusivity covers only the use or conditions of use associated with the new clinical investigations and does not prohibit the FDA from approving ANDAs for drugs containing the original active agent for other uses or conditions of use. Five-year and three-year exclusivity will not delay the submission or approval of a full NDA. However, an applicant submitting a full NDA would be required to conduct or obtain a right of reference to all of the preclinical studies and adequate and well-controlled clinical trials necessary to demonstrate safety and effectiveness.

In addition, as described above, under the GAIN Act a new drug that is designated as a QIDP is eligible for an additional five years of exclusivity to be added to certain other exclusivity periods that the application may qualify for upon approval, specifically five-year exclusivity, three-year exclusivity, and orphan exclusivity.

Pediatric Exclusivity

The Best Pharmaceuticals for Children Act provides for an additional six months of exclusivity, which is added on to patent and exclusivity periods in effect at the time the pediatric exclusivity award is granted, if a sponsor conducts clinical trials in children in response to a written request from the FDA, or a Written Request. The FDA may request studies on approved indications in separate Written Requests. The issuance of a Written Request does not require the sponsor to undertake the described studies. To date, we have not received any Written Requests.

Post-approval Requirements

Once an approval is granted, the FDA may withdraw the approval if compliance with regulatory requirements and standards is not maintained or if problems occur after the product reaches the market. Later discovery of previously unknown problems, including safety issues, with a product may result in restrictions on the product or even complete withdrawal of the product from the market. After approval, some types of changes to the approved product, such as adding new indications, manufacturing changes and additional labeling claims, are subject to further FDA review and approval. In addition, the FDA may require testing and surveillance programs to monitor the effect of approved products that have been commercialized, and the FDA has the power to prevent or limit further marketing of a product based on the results of these post-marketing programs. The FDA and other authorities also strictly regulate the promotional claims that may be made about prescription products. Under the FDCA the sponsor of an approved drug in the United States may not promote that drug for unapproved, or off-label, uses, although a physician may prescribe a drug for an off-label use in accordance with the practice of medicine. If we are found to have promoted off-label uses, we may be subject to significant liability, including sanctions, civil and criminal fines, and injunctions prohibiting us from engaging in specified promotional conduct.

Moreover, any drug products manufactured or distributed pursuant to FDA approvals are subject to continuing regulation by the FDA, including, among other things:

- record-keeping requirements;
- reporting of adverse experiences with the drug;
- providing the FDA with updated safety and efficacy information;
- drug sampling and distribution requirements;

- notifying the FDA and gaining its approval of specified manufacturing or labeling changes;
- complying with certain electronic records and signature requirements; and
- complying with FDA promotion and advertising requirements.

Drug manufacturers and other entities involved in the manufacture and distribution of approved drugs are required to register their establishments with the FDA and certain state agencies, and are subject to periodic unannounced inspections by the FDA and some state agencies for compliance with cGMP requirements and other laws.

Failure to comply with the FDCA and other applicable U.S. requirements at any time during the product development process, approval process or after approval may subject us to a variety of administrative or judicial sanctions, any of which could have a material adverse effect on us. These sanctions could include:

- refusal to approve pending applications;
- withdrawal of an approval;
- imposition of a clinical hold;
- warning letters, untitled letters and similar communications;
- product seizures or recalls;
- total or partial suspension of production or distribution; or
- injunctions, fines, restitution, disgorgement of profits or civil or criminal investigations and penalties brought by the FDA and the Department of Justice, or DOJ, or other governmental entities.

From time to time, legislation is drafted, introduced and passed in Congress that could significantly change the statutory provisions governing the approval, manufacturing and marketing of products regulated by the FDA. In addition, FDA regulations and guidance are often revised or reinterpreted by the agency in ways that may significantly affect our business and our products. It is impossible to predict whether legislative changes will be enacted, or FDA regulations, guidance or interpretations changed or what the impact of such changes, if any, may be.

Other Healthcare Laws

We may be subject to additional healthcare regulation and enforcement by the federal government and by authorities in the states and foreign jurisdictions in which we conduct our business. Within the United States, we are subject to various federal and state laws pertaining to health care "fraud and abuse," including anti-kickback laws and false claims laws. Although the specific provisions of these laws vary, their scope is generally broad and there may not be regulations, guidance or court decisions that apply the laws to particular industry practices. There is therefore a possibility that our practices might be challenged under such laws. Anti-kickback laws generally prohibit a prescription drug manufacturer from soliciting, offering, receiving, or paying any remuneration to generate business, including the purchase or prescription of a particular drug. False claims laws prohibit anyone from knowingly and willingly presenting, or causing to be presented, any claims for payment for reimbursed drugs or services to third party payors (including Medicare and Medicaid) that are false or fraudulent. Violations of "fraud and abuse" laws may be punishable by criminal or civil sanctions, including fines and civil monetary penalties, and/or exclusion from federal health care programs (including Medicare and Medicaid).

Laws and regulations have also been enacted by the federal government and various states to regulate the sales and marketing practices of pharmaceutical manufacturers. The laws and regulations generally limit financial interactions between manufacturers and health care providers; require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the U.S. federal government; and/or require disclosure to the government and/or public of financial interactions (so-called "sunshine laws"). State laws may also require disclosure of pharmaceutical pricing information and marketing expenditures. Manufacturers must also submit information to the FDA on the identity and quantity of drug samples requested and distributed by a manufacturer during each year. Many of these laws and regulations contain ambiguous requirements or require administrative guidance for implementation. Given the lack of clarity in laws and their implementation, our activities could be subject to the penalty provisions of the pertinent federal and state laws and regulations.

Federal and state laws also protect the privacy and security of health information specifically or other personally identifiable information generally. The laws may apply to us or to healthcare providers and other third parties with which we interact.

Foreign Regulation

In addition to regulations in the United States, we will be subject to a variety of foreign regulations governing clinical trials and commercial sales and distribution of our products. Whether or not we obtain FDA approval for a product, we must obtain approval by the comparable regulatory authorities of foreign countries or economic areas, such as the EU, before we may commence clinical trials or market products in those countries or areas. The approval process and requirements governing the conduct of clinical trials, product licensing, pricing and reimbursement vary greatly from place to place, and the time may be longer or shorter than that required for FDA approval.

Under EU regulatory systems, a company may submit marketing authorization applications under the centralized, decentralized or mutual recognition procedures, or under the purely national route of approval. The centralized procedure is compulsory for medicinal products produced by biotechnology or those medicinal products containing new active substances for specific indications such as the treatment of AIDS, cancer, neurodegenerative disorders, diabetes, viral diseases, and designated orphan medicines, and is optional for other medicines that are highly innovative. Under the centralized procedure, a marketing application is submitted to the EMA, where it will be evaluated by the relevant scientific committee, in most cases the Committee for Medicinal Products for Human Use, and a favorable opinion typically results in the grant by the European Commission of a single marketing authorization that is valid for all EU member states and, by extension (after national implementing measures), in Norway, Iceland and Liechtenstein. In general, an initial marketing authorization is valid for five years, but once renewed is usually valid for an unlimited period. The decentralized procedure allows marketing authorization applications to be submitted simultaneously in two or more EU member states, whereas the mutual recognition procedure must be used if the product has already been authorized in at least one other EU member state. Both the decentralized and mutual recognition procedures provide for approval by one or more "concerned" member states based on an assessment of an application performed by one-member state, known as the "reference" member state. Under the decentralized approval procedure, an applicant submits an application, or dossier, and related materials to the reference member state and concerned member states. The reference member state prepares a draft assessment and drafts of the related materials within 120 days after receipt of a valid application. Within 90 days of receiving the reference member state's assessment report, each concerned member state must approve the assessment report and related materials, unless they identify a serious risk to public health. Under the mutual recognition procedure, the concerned member states have the same 90-day period to recognize the marketing authorization in the reference member state. In either case, concerns about serious risks to public health escalate through the relevant EMA scientific committees, and the disputed points may eventually result in a consensus opinion from the Committee for Medicinal Products for Human Use that is referred to the European Commission, whose decision is binding on all member states. The purely national procedure results in a marketing authorization in a single EU member state.

In light of the United Kingdom's vote in 2016 to leave the EU, the so-called Brexit vote, there may be changes forthcoming in the scope of the EU marketing authorization approval procedure, as well as changes to the United Kingdom's national medicines laws, as the terms of that exit are negotiated between the United Kingdom and the EU.

Reimbursement

Significant uncertainty exists regarding the coverage and reimbursement status of products approved by the FDA and other government authorities. Sales of our products will depend, in part, on the availability of coverage and the adequacy of reimbursement from third-party payors. Third-party payors include government authorities or government healthcare programs, such as Medicare and Medicaid, and private entities, such as managed care organizations , private health insurers and other organizations. The process for determining whether a third-party payor will provide coverage for a product may be separate from the process for setting the reimbursement rate that the payor will pay for the drug product. Third-party payors may limit coverage to specific products on an approved list, or formulary, which might not include all of the FDA-approved products for a particular indication. Some third-party payors may manage utilization of a particular product by requiring pre-approval (known as "prior authorization") for coverage of particular prescriptions (to allow the payor to assess medical necessity). Moreover, patients who cannot meet the conditions of prior authorizations are often prevented from obtaining the prescribed medication, because they cannot afford to pay for the medication without reimbursement. Third-party payor's decision to provide coverage for a drug product does not imply that an adequate reimbursement rate will be approved. Adequate third-party reimbursement may not be available to enable us to maintain net price levels sufficient to realize an appropriate return on our investment in product development. Additionally, coverage and reimbursement for drug products can differ significantly from payor to payor. One third-party payor's decision to cover a particular drug product or service does not ensure that other payors will also provide coverage for the medical product or service, or will provide coverage at an adequate reimbursement rate.

Third-party payors are increasingly challenging the price and examining the cost-effectiveness of new products and services in addition to their safety and efficacy. To obtain or maintain coverage and reimbursement for any current or future product, we may need to conduct expensive pharmacoeconomic studies to demonstrate the medical necessity and cost-effectiveness of our product. These studies will be in addition to the studies required to obtain or maintain regulatory approvals. If third-party payors do not consider a product to be cost-effective compared to other available therapies, they may not cover the product after approval as a benefit under their plans or, if they do, the level of payment may not be sufficient to allow a company to sell its products at a profit. Thus, obtaining and maintaining reimbursement status is complex and costly.

Additionally, the containment of healthcare costs has become a priority of federal and state governments, and the prices of drugs have been a focus in this effort. The U.S. government, state legislatures and foreign 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 our net revenue and results. Decreases in third-party reimbursement for our or our partners' products or a decision by a third-party payor to not cover our or our partners' products could reduce physician usage of the product and have a material adverse effect on our sales, results of operations and financial condition. We expect that the pharmaceutical industry will experience pricing pressures due to the increasing influence of managed care (and related implementation of managed care strategies to control utilization), additional federal and state legislative and regulatory proposals to regulate pricing of drugs, limit coverage of drugs or reduce reimbursement for drugs, public scrutiny and the Trump administration's expressed desire to address the perceived high cost of pharmaceuticals in the U.S. While we cannot predict what executive, legislative and regulatory proposals will be adopted or other actions will occur, such events could have a material adverse effect on our business, financial condition and profitability.

Within the United States, we may be required to provide discounts or rebates under government healthcare programs or to certain government and private purchasers in order to obtain coverage under federal healthcare programs such as Medicaid. Participation in such programs may require us to track and report certain drug prices. We may be subject to fines and other penalties if we fail to report such prices accurately.

In addition, in some foreign countries, the proposed pricing for a drug must be approved before it may be lawfully marketed. The requirements governing drug pricing vary widely from country to country. For example, the EU provides options for its member states to restrict the range of medicinal products for which their national health insurance systems provide reimbursement and to control the prices of medicinal products for human use. A member state may approve a specific price for the medicinal product or it may instead adopt a system of direct or indirect controls on the profitability of the company placing the medicinal product on the market. There can be no assurance that any country that has price controls or reimbursement limitations for pharmaceutical products will allow favorable reimbursement and pricing arrangements for any of our products. Historically, products launched in the EU do not follow price structures of the United States and generally tend to be significantly lower.

Health Care and Other Reform

In the United States, there have been and continue to be a number of significant legislative initiatives to contain healthcare costs. Federal and state governments continue to propose and pass legislation designed to reform delivery of, or payment for, health care, which include initiatives to reduce the cost of healthcare. For example, in March 2010, the United States Congress enacted the Patient Protection and Affordable Care Act and the Health Care and Education Reconciliation Act, or the Healthcare Reform Act, which expanded health care coverage through Medicaid expansion and the implementation of the individual mandate for health insurance coverage and which included changes to the coverage and reimbursement of drug products under government healthcare programs. Under the Trump administration, there have been ongoing efforts to modify or repeal all or certain provisions of the Healthcare Reform Act. For example, tax reform legislation was enacted at the end of 2017 that eliminates the tax penalty established under Healthcare Reform Act for individuals who do not maintain mandated health insurance coverage beginning in 2019. In a May 2018 report, the Congressional Budget Office estimated that, compared to 2018, the number of uninsured will increase by 3 million in 2019 and 6 million in 2028, in part due to the elimination of the individual mandate. The Healthcare Reform Act has also been subject to judicial challenge. In December 2018, a federal district court, in a challenge brought by a number of state attorneys general, found the Healthcare Reform Act unconstitutional in its entirety because, once Congress repealed the individual mandate provision, there was no longer a basis to rely on Congressional taxing authority to support enactment of the law. Pending appeals, which could take some time, the Healthcare Reform Act is still operational in all respects.

There have also been other reform initiatives under the Trump Administration, including initiatives focused on drug pricing. For example, the Bipartisan Budget Act of 2018 contained various provisions that affect coverage and reimbursement of drugs, including an increase in the discount that manufacturers of Medicare Part D brand name drugs must provide to Medicare Part D beneficiaries during the coverage gap from 50% to 70% starting in 2019. As another example, in May of 2018, President Trump and the Secretary of the Department of Health and Human Services released a "blueprint" to lower prescription drug prices and out-of-pocket costs. Certain proposals in the blueprint, and related drug pricing measures proposed since the blueprint, could cause significant operational and reimbursement changes for the pharmaceutical industry. As another example, in November of 2018, the Centers for Medicare & Medicaid Services, or CMS, issued an advance notice of proposed rulemaking that proposed revisions to Medicare Part D to support health plans' negotiation of lower drug prices with manufacturers and reduce health plan members' out-of-pocket costs. The Office of Inspector General, or OIG, within the Department of Health and Human Services, or HHS, issued a proposed rule in February of 2019 that would revise the federal anti-kickback statute to limit protection for discounts offered by pharmaceutical manufacturers to pharmacy benefit managers (PBMs), Medicare Part D plans, and Medicaid managed care plans that are not reflected in the price charged to the patient at the pharmacy counter and to provide protection only for certain types of service fees paid by pharmaceutical manufacturers to PBMs.

There have also been efforts by federal and state government officials or legislators to implement measures to regulate prices or payment for pharmaceutical products, including legislation on drug importation. Recently, there has been considerable public and government scrutiny of pharmaceutical pricing and proposals to address the perceived high cost of pharmaceuticals. There have also been recent state legislative efforts to address drug costs, which generally have focused on increasing transparency around drug costs or limiting drug prices.

General legislative cost control measures may also affect reimbursement for our product candidates. The Budget Control Act, as amended, resulted in the imposition of 2% reductions in Medicare (but not Medicaid) payments to providers in 2013 and will remain in effect through 2027 unless additional Congressional action is taken. Any significant spending reductions affecting Medicare, Medicaid or other publicly funded or subsidized health programs that may be implemented and/or any significant taxes or fees that may be imposed on us could have an adverse impact on our results of operations.

Adoption of new legislation at the federal or state level could affect demand for, or pricing of, our current or future products if approved for sale. We cannot, however, predict the ultimate content, timing or effect of any changes to the Healthcare Reform Act or other federal and state reform efforts. There is no assurance that federal or state health care reform will not adversely affect our future business and financial results.

Employees

As of February 28, 2019, we had 104 total employees, 101 of whom are full-time employees and 37 of whom were primarily engaged in research and development activities. A total of seven employees have an M.D., Pharm.D, or Ph.D. degree. None of our employees are represented by a labor union, and we consider our employee relations to be good.

Financial and Segment Information

We operate our business as a single segment, as defined by generally accepted accounting principles. Our financial information is included in the consolidated financial statements and the related notes.

Available Information

We are a reporting company under the Securities Exchange Act of 1934, as amended, or the Exchange Act, and file reports, proxy statements and other information with the Securities and Exchange Commission, or the SEC. You may access this information at the SEC's Internet site: www.sec.gov. This site contains reports, proxies and information statements and other information regarding issuers that file electronically with the SEC.

Our internet web site address is *www.paratekpharma.com*. We make available, free of charge at the "Investors" portion of our web site, annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. Reports of beneficial ownership filed pursuant to Section 16(a) of the Exchange Act are also available on our web site. Information in, or that can be accessed through, this web site is not part of this Annual Report on Form 10-K.

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 and all information contained in this report before you decide to purchase our common stock. If any of the possible adverse events described below actually occurs, we may be unable to conduct our business as currently planned and our financial condition and operating results could be harmed. In addition, the trading price of our common stock could decline due to the occurrence of any of the events described below, and you may lose all or part of your investment. Additional risks and uncertainties not presently known to us or that we currently deem immaterial may also impair our business.

Risk Related to Financial Condition

We have incurred significant losses since inception and anticipate that we will incur losses for the foreseeable future. To date we have not generated any profit from product sales and we may never achieve or sustain profitability.

We received FDA approval for NUZYRA in October 2018 and launched NUZYRA in the United States in February 2019. Additionally, FDA approval was granted in October 2018 for SEYSARA, which Almirall has rights to commercialize and with respect to which we will be entitled to tiered royalties, and it was launched in January 2019. Although NUZYRA and SEYSARA are now being sold by us and Almirall, respectively, it will take some time to attain profitability and we may never do so. Our net loss for the year ended December 31, 2018 was $112.4 million. As of December 31, 2018, our accumulated deficit was $582.5 million. We expect to continue to incur losses for the foreseeable future as we seek to maintain and expand regulatory approvals for our products, commercialize NUZYRA, establish our sales, marketing and distribution infrastructure to commercialize products for which we obtain marketing approval, including NUZYRA, and add personnel to support our product development and commercialization efforts and operations. The net losses and negative operating cash flows incurred to date, together with expected future losses, have had, and likely will continue to have, an adverse effect on our stockholders' equity and working capital. The amount of future net losses will depend, in part, on the rate of future growth of our expenses and our ability to generate revenue.

Because of the numerous risks and uncertainties associated with pharmaceutical product development, we are unable to accurately predict the timing or amount of increased expenses or when, or if, we will be able to generate any product revenues or achieve profitability. For example, our expenses could increase if we are required by regulatory agencies outside of the United States to perform studies in addition to those that we have already performed or currently expect to perform.

To become and remain profitable, we must succeed in developing and commercializing products with significant market potential. This will require us to be successful in a range of challenging activities, including manufacturing, marketing and commercializing approved products, such as NUZYRA, developing product candidates and obtaining regulatory approval for them. We may never succeed in these activities and may never generate revenue from product sales that is significant enough to achieve profitability. Even if we achieve profitability in the future, we may not be able to sustain profitability in subsequent periods. Our failure to become or remain profitable would depress the market value of our common stock, could impair our ability to raise capital, expand our business, develop other product candidates or continue our operations and could cause investors to lose all or part of their investments.

We will continue to require substantial additional funding, which may not be available to us on acceptable terms, or at all, and, if not available, may require us to delay, scale back or cease our product development programs or commercialization efforts for NUZYRA.

As of December 31, 2018, our cash, cash equivalents and marketable securities were $292.8 million. We will require substantial additional funding to meet FDA post-marketing approval requirements for NUZYRA, to complete the commercialization of NUZYRA, to fund the development of omadacycline in other indications, and to advance the development of our other product candidates, and such funding may not be available on favorable terms or at all. Although it is difficult to predict our liquidity requirements, based upon our current operating plan, we anticipate that our cash, cash equivalents and marketable securities will enable us to fund our operating expenses and capital expenditure requirements through at least the next 12 months from the filing date of this Annual Report on Form 10-K. Because the profitability of NUZYRA and SEYSARA, and the successful development of any other future product candidates, is uncertain, we are unable to estimate the actual funds we will require to fund our continuing operations, including for our clinical development programs and commercialization efforts for NUZYRA.

Our future funding requirements will depend on many factors, including but not limited to:

- the costs and timing of commercialization activities for NUZYRA;
- product revenue received from commercial sales of NUZYRA;
- royalty revenue received from commercial sales of SEYSARA by Almirall;

- the ability of Zai to develop, manufacture and commercialize omadacycline in the Zai territory;
- the scope, progress, timing, cost and results of research, preclinical development and clinical trials;
- the costs, timing and outcome of seeking, obtaining, maintaining and expanding FDA and non-U.S. regulatory approvals;
- the costs associated with manufacturing and establishing sales, marketing and distribution capabilities;
- the number and characteristics of other product candidates that we may pursue;
- our ability to maintain, expand and defend the scope of our intellectual property portfolio, including the amount and timing of any payments we may be required to make in connection with the licensing, filing, defense and enforcement of any patents or other intellectual property rights;
- our need to hire additional management, scientific, commercial, operations and medical personnel;
- the effect of competing products that may limit market penetration of our products;
- our need to implement additional internal systems and infrastructure, including financial and reporting systems
- resources required to develop and implement policies and processes to promote ongoing compliance with applicable healthcare laws and regulations;
- costs required to ensure that our and our partners' business arrangements with third parties comply with applicable healthcare laws and regulations; and
- the economic and other terms, timing and success of our existing licensing arrangements and any collaboration, licensing, or other arrangements into which we may enter in the future, including the timing of receipt of any milestone or royalty payments under these agreements.

Until we generate a sufficient amount of product and royalty revenue to finance our cash requirements, which we may never do, we expect to finance future cash needs primarily through a combination of public or private equity offerings, debt or other structured financings, strategic collaborations and grant funding. There can be no assurance that we would be successful in securing additional funds on acceptable terms. If additional funds are not available, we may be forced to cease operations, significantly reduce operating expenses or delay, curtail or eliminate one or more of our development programs or our business operations.

Raising additional capital or entering into certain other arrangements may cause dilution to our stockholders, restrict our operations or require us to relinquish rights.

Until such time, if ever, as we can generate substantial product revenue, we expect to finance our cash needs primarily through the sale of additional equity or convertible debt securities, which would dilute shareholder ownership interest. The terms of these new securities may include liquidation or other preferences that adversely affect shareholders' rights as common stockholders. Future debt financing, if available at all, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends. If we raise additional funds through collaborations, strategic alliances or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, NUZYRA, sarecycline, other product candidates or future revenue streams, or grant licenses on terms that are not favorable to us. We cannot assure you that we will be able to obtain additional funding if and when necessary. If we are unable to obtain adequate financing on a timely basis, we could be required to grant rights to develop and market NUZYRA, sarecycline or our other product candidates that we may otherwise prefer to develop and market ourselves.

Our level of indebtedness and debt service obligations could adversely affect our financial condition and may make it more difficult for us to fund our operations.

On September 30, 2015, we entered into a Loan and Security Agreement, or the Loan Agreement, with Hercules Technology II, L.P. and Hercules Technology III, L.P., together, Hercules, and certain other lenders and Hercules Technology Growth Capital, Inc. (as agent). We have executed five amendments to the Loan Agreement subsequent to September 30, 2015, providing access to term loans with an aggregate principal amount of up to $90.0 million. As of December 31, 2018, we have drawn down on $70.0 million. The two remaining tranches of up to $10.0 million each ($20.0 million total), or the Additional Tranches, may be available to the Company, subject to determination by Hercules, in its sole discretion, whether to provide such tranches. As such there can be no assurance as to whether or not the Additional Tranches shall be funded. The latest amendment extended the date on which the Company is required to begin making monthly principal installments on loans previously outstanding under the Hercules Loan Agreement, or the Prior Tranches, from January 1, 2019 to January 1, 2021, subject to the Company's receipt of marketing approval for the Company's lead product candidate, omadacycline, or the Interest Only Period Extension Event, which was obtained on October 2, 2018. Beginning on January 1, 2021, the Company is obligated to make payments in equal monthly installments of principal and interest with respect to the Prior Tranches. The Prior Tranches mature on September 1, 2021, due to the achievement of the Interest Only Period Extension Event. With respect to the $10 million loan made to the Company upon the execution of the fifth amendment, the Company is obligated to make payments in equal monthly installments of principal and interest beginning on September 1, 2020 (subject to extension to March 1, 2021 or September 1, 2021 upon achievement of specified levels of omadacycline revenue), and such loan matures on August 1, 2022.

All obligations under the Loan Agreement, as amended, are secured by substantially all of our existing property and assets, excluding our intellectual property. This indebtedness may create additional financing risk for us, particularly if our business or prevailing financial market conditions are not conducive to paying off or refinancing our outstanding debt obligations at maturity. This indebtedness could also have important negative consequences, including:

- we will need to repay our indebtedness by making payments of interest and principal, which will reduce the amount of money available to finance our operations, our research and development efforts and other general corporate activities; and
- our failure to comply with the affirmative, restrictive or financial covenants in the Loan Agreement, as amended, could result in an event of default that, if not cured or waived, could result in the acceleration of our obligation to repay this indebtedness, and Hercules could seek to enforce its security interest in the assets securing such indebtedness.

To the extent additional debt (including without limitation the Additional Tranches) is added to our current debt levels, the risks described above could increase.

We may not have cash available to us in an amount sufficient to enable us to make interest or principal payments on our indebtedness when due.

Failure to satisfy our current and future debt obligations under the Loan Agreement, as amended, could result in an event of default and, as a result, Hercules could accelerate all of the amounts due. In the event of an acceleration of amounts due under the Loan Agreement, as amended, as a result of an event of default, we may not have sufficient funds or may be unable to arrange for additional financing to repay our indebtedness. In addition, Hercules could seek to enforce its security interests in the assets securing such indebtedness.

We are subject to certain restrictive covenants which, if breached, could have a material adverse effect on our business and prospects.

The Loan Agreement, as amended, imposes operating and other restrictions on us. Such restrictions will affect, and in many respects limit or prohibit, our ability and the ability of any future subsidiary to, among other things:

- dispose of certain assets;
- change our lines of business;
- engage in mergers or consolidations;
- incur additional indebtedness;
- create liens on assets;
- pay dividends and make distributions or repurchase our capital stock; and
- engage in certain transactions with affiliates.

Risks Related to Maintaining and Expanding Regulatory Approval and Other Legal Compliance Matters

If clinical trials for omadacycline for the treatment of UTI, are prolonged, delayed or stopped, we may be unable to obtain regulatory approval and commercialize omadacycline for the treatment of UTI on a timely basis.

In October 2018, the FDA approved NUZYRA in the United States for the treatment of adults with CABP and ABSSSI that are proven or strongly suspected to be caused by susceptible bacteria. We have a Phase 2 program currently in process to evaluate omadacycline for the treatment of UTI. Enrollment has commenced for the first of two planned Phase 2 clinical studies. The first study will evaluate the efficacy, safety, tolerability and pharmacokinetics of omadacycline in female patients with cystitis, a common uncomplicated UTI. The second study, which we initiated in the fourth quarter of 2018, will evaluate the efficacy, safety, tolerability and pharmacokinetics of omadacycline in patients with acute pyelonephritis, a common complicated UTI. The completion of these planned clinical trials could be substantially delayed or prevented by several factors, including:

- delay or failure to obtain sufficient supplies of the product candidate for our clinical trials;
- delay or failure to obtain sufficient supplies of the comparator antibiotic for our clinical trials;
- the limited number of, and competition for, suitable sites to conduct our clinical trials, many of which may already be engaged in other clinical trial programs, including some that may be for the same indication as our product candidates;
- any delay or failure to obtain regulatory approval or agreement to commence a clinical trial in any of the countries where enrollment is planned;
- clinical holds on, or other regulatory objections to, a new or ongoing clinical trial;
- delay or failure to reach agreement on acceptable clinical trial agreement terms or clinical trial protocols with prospective sites or clinical research organizations, or CROs, or local regulatory authorities, the terms of which can be subject to extensive negotiation and may vary significantly among different sites or CROs; and
- delay or failure to obtain Institutional Review Board/ethics committee approval to conduct a clinical trial at a prospective site or within a specific region or country.

The completion of our clinical trials could also be substantially delayed or prevented by several factors, including:

- slower than expected rates of patient recruitment and enrollment;
- failure of patients to complete the clinical trial;
- unforeseen safety issues, including severe or unexpected drug-related adverse effects experienced by patients;
- lack of omadacycline efficacy evidenced during clinical trials;
- termination of our clinical trials by one or more clinical trial sites;
- inability or unwillingness of patients or clinical investigators to follow our clinical trial protocols;
- inability to monitor patients adequately during or after treatment by us and/or our CROs;
- delay or failure to obtain sufficient supplies of omadacycline or of the relevant comparator product; and
- the need to repeat or terminate clinical trials as a result of inconclusive or negative results or unforeseen complications during clinical trial testing.

In particular, our ability to enroll patients in our clinical trials in sufficient numbers and on a timely basis will be subject to a number of factors, including the size of the patient population needed, the nature of the protocol, the proximity of patients to clinical sites, the availability of effective treatments for the relevant indication and the eligibility criteria for the clinical trial. For example, in the Phase 2 clinical trials of omadacycline in UTI, patients who have previously taken potentially effective antibiotics for the treatment of an infection within 72 hours of receiving the first dose of study medication will be excluded from the clinical trial. Depending upon a region's or a clinical site's standard of care for the administration of antibiotics, this could affect our ability to enroll patients in these clinical trials in a timely fashion.

Changes in regulatory requirements and guidance may also occur, and we may need to amend clinical trial protocols to reflect these changes with appropriate regulatory authorities. Amendments may require us to resubmit clinical trial protocols to regulatory agencies/ Institutional Review Boards/ethics committees for re-examination, which may impact the costs, timing or successful completion of a clinical trial. Our clinical trials may be suspended or terminated at any time by the FDA, other regulatory authorities, the Institutional Review Board overseeing the clinical trial at issue, any of our clinical trial sites with respect to that site or us due to a number of factors, including:

- failure to conduct the clinical trial in accordance with regulatory requirements or our clinical protocols;
- unforeseen safety issues or any determination that a clinical trial presents unacceptable health risks;

- lack of adequate funding to continue the clinical trial due to unforeseen costs or other business decisions; and
- upon a breach or pursuant to the terms of any agreement with, or for any other reason by, current or future collaborators that have responsibility for the clinical development of any of our product candidates.

In addition, clinical practices vary globally, and there is a lack of harmonization among the guidance provided by various regulatory bodies of different regions and countries with respect to the data that is required to receive marketing approval, which makes designing global trials increasingly complex. Differing regulatory approval requirements in different countries also make it more difficult for us to conduct unified global trials, which can lead to increased development costs and marketing delays or non-viability of our clinical trials. The approval procedure and the time required to obtain approval also varies among countries. Furthermore, regulatory agencies may have varying interpretations of the same data, and approval by one regulatory authority does not ensure approval by regulatory authorities in other jurisdictions.

Any failure or significant delay in completing clinical trials for omadacycline for the treatment of UTI would adversely affect our ability to expand regulatory approval of NUZYRA and our commercial prospects and ability to generate product revenue for sales of NUZYRA in such indication will be diminished.

The results of previous clinical trials may not be predictive of future results, and the results of any ongoing or future clinical trials may not satisfy the requirements of the FDA or non-U.S. regulatory authorities.

Clinical failure can occur at any stage of clinical development. Clinical trials may produce negative or inconclusive results, and we or our partners may decide, or regulators may require us, to conduct additional clinical or preclinical testing which could delay submission of a supplemental NDA and regulatory approval. We will be required to demonstrate with substantial evidence through well-controlled clinical trials that our product candidates are safe and effective for use in a diverse population before we can seek regulatory approvals for their commercial sale. Success in early stage clinical trials does not mean that future larger registration clinical trials will be successful, because product candidates in later-stage clinical trials may fail to demonstrate sufficient safety and efficacy to the satisfaction of the FDA and non-U.S. regulatory authorities despite having progressed through early stage clinical trials. Product candidates that have shown promising results in early-stage (pre-Phase 3) clinical trials may still suffer significant setbacks in subsequent registration clinical trials.

In addition, the design of a clinical trial can determine whether its results will support approval of a product and/or new indications, and flaws in the design of a clinical trial may not become apparent until the clinical trial is underway, well advanced or completed. Further, if future product candidates are found to be unsafe or lack efficacy, we will not be able to obtain regulatory approval for them and our business would be harmed. A number of companies in the pharmaceutical industry, including those with greater resources and experience than us, have suffered significant setbacks in advanced clinical trials, even after obtaining promising results in earlier stage clinical trials.

Positive results in our randomized Phase 2 and Phase 3 clinical studies of omadacycline in complicated skin and skin structure infections, ABSSSI and CABP, may not be predictive of the results in any other indications, such as omadacycline for the treatment of UTI. In some instances, there can be significant variability in safety and/or efficacy results between different clinical trials of the same product candidate due to numerous factors, including changes in clinical trial protocols, differences in size, type and geographic distribution of the patient populations, adherence to the dosing regimen and other clinical trial protocols and the rate of dropout among clinical trial participants. We do not know whether any Phase 2, Phase 3 or other clinical trials we or any of our collaborators may conduct, or have conducted in the past, will demonstrate consistent or adequate efficacy and safety to obtain regulatory approval to market our future product candidates.

Further, our and our partners' product candidates may not be approved even if they achieve their primary endpoints in Phase 3 clinical trials or registration trials. The FDA or other non-U.S. regulatory authorities may disagree with our clinical trial design and our interpretation of data from preclinical studies and clinical trials even when we have Special Protocol Assessment agreements. In addition, any of these regulatory authorities may change requirements for the approval of a product candidate even after reviewing and providing comments or advice on a protocol for a pivotal Phase 3 clinical trial that has the potential to result in FDA or other agencies' approval. In addition, any of these regulatory authorities may also approve a product candidate for fewer or more limited indications than we request or may grant approval contingent on the performance of costly post-marketing clinical trials. In addition, the FDA or other non-U.S. regulatory authorities may not approve the labeling claims that we believe would be supported by the clinical data, or be necessary or desirable for the successful commercialization of our products. If an unforeseen safety issue arises, the FDA always has the option to initiate a REMS or add additional warnings to a product label upon approval.

The regulatory approval process is expensive, time consuming and uncertain and may prevent us or our partners from obtaining approvals for the commercialization of our product candidates.

The research, testing, manufacturing, labeling, approval, selling, marketing and distribution of drug products are subject to extensive regulation by the FDA and other U.S. and non-U.S. regulatory authorities. Regulations differ from country to country, which will require us to expend additional resources in each market for which a separate regulatory approval is required. We are not permitted to market our product candidates outside of the United States until we receive marketing approval from applicable regulatory authorities outside of the United States. Although omadacycline and sarecycline received FDA approval, approval of other indications, including treatment of UTI with omadacycline, is subject to the risks of failure inherent in drug development.

Failure to comply with FDA and non-U.S. regulatory requirements may, either before or after product approval, if any, subject us to administrative or judicially imposed sanctions, including:

- restrictions on the products, manufacturers or manufacturing process;
- warning letters;
- civil and criminal penalties;
- injunctions;
- suspension or withdrawal of regulatory approvals;
- product seizures, detentions or import bans;
- voluntary or mandatory product recalls and publicity requirements;
- total or partial suspension of production;
- imposition of restrictions on operations, including costly new manufacturing requirements; and
- refusal to approve pending NDAs or supplements to approved NDAs.

The FDA and foreign regulatory authorities also have substantial discretion in the drug approval process. The number of preclinical studies and clinical trials that will be required for regulatory approval varies depending on the product candidate, the disease or condition that the product candidate is designed to address, and the regulations applicable to any particular drug candidate. Regulatory agencies can delay, limit or deny approval of a product candidate for many reasons, including:

- a product candidate may not be deemed safe or effective;
- the results may not confirm the positive results from earlier preclinical studies or earlier stage clinical trials;
- regulatory agencies may not find the data from preclinical studies and clinical trials sufficient;
- regulatory agencies might not approve our third-party manufacturer's processes or facilities; or
- regulatory agencies may change their approval policies or adopt new regulations.

Any delay in obtaining or failure to obtain required approvals could materially adversely affect our ability to generate revenue from omadacycline or any other particular product candidate, which likely would result in significant harm to our financial position. Furthermore, any regulatory approval to market a product may be subject to limitations on the indicated uses for which we may market the product. These limitations may limit the size of the market opportunity for the product.

Even though NUZYRA and SEYSARA have been approved by the FDA in the United States, they face post-approval development and regulatory requirements, which may limit how they are manufactured and marketed, and could materially impair our ability to generate revenue.

In October 2018, the FDA approved NUZYRA in the United States for the treatment of adults with CABP and ABSSSI that are proven or strongly suspected to be caused by susceptible bacteria, as well as SEYSARA for the treatment of inflammatory lesions of non-nodular moderate to severe acne vulgaris in patients nine years of age and older. NUZYRA and SEYSARA are subject to, among other things, ongoing FDA requirements governing the manufacturing, labeling, packaging, storage, advertising, promotion, recordkeeping and submission of safety, efficacy and other post-market information. As part of the FDA approval for NUZYRA, we are required to conduct post-marketing pediatric studies, including a single dose pharmacokinetic and safety study in children ages eight to seventeen who are receiving antibacterial drug therapy for an infectious disease, an active-controlled safety study in children ages eight to seventeen who have acute bacterial skin and skin structure infections, and an active-controlled safety study in children

ages eight to seventeen who have CABP. In addition, we are also required to conduct an active-controlled safety and efficacy study in adults with CABP and a U.S. surveillance study for five years from the date of marketing to determine if resistance to NUZYRA has developed in those organisms specific to the indications in the label. In addition, approved products, manufacturers and manufacturers' facilities are required to comply with extensive FDA and other regulatory authority requirements, including ensuring that quality control and manufacturing procedures conform to current GMP regulations, which include requirements relating to quality control and quality assurance as well as the corresponding maintenance of records and documentation and reporting requirements. As such, we and our partners and any of our and their respective contract manufacturers are subject to ongoing review and periodic inspections to assess compliance with cGMPs. Additionally, to the extent we want to make certain changes to the approved products, product labeling, or manufacturing processes or manufacturing sites, we will need to submit new applications or supplements to FDA and obtain the agency's approval.

Accordingly, we and others with whom we work will continue to expend time, money and effort in all areas of regulatory compliance, including manufacturing, production and quality control. We and our partners are also required to report adverse reactions and production problems, if any, to the FDA and to comply with requirements concerning, among other things, advertising and promotion for our products. 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 label. Although the FDA and other regulatory agencies do not regulate a physician's choice of drug treatment made in the physician's independent medical judgment, they do restrict promotional communications from pharmaceutical companies or their sales force with respect to off-label uses of products for which marketing clearance has not been issued. Accordingly, we and our partners will not be able to promote our products for indications or uses for which they are not approved. A company that is found to have promoted off-label use of its product may be subject to significant liability, including civil and criminal sanctions. We intend to comply with the requirements and restrictions of the FDA and other regulatory agencies with respect to off-label promotion, but we cannot be sure that the FDA or other regulatory agencies will agree that we have not violated their restrictions. As a result, we may be subject to criminal and civil liability. If the FDA or any other governmental agency initiates an enforcement action against us or if we are the subject of a qui tam suit and it is determined that we violated prohibitions relating to the promotion of products for unapproved uses, we could be subject to substantial civil or criminal fines or damage awards and other sanctions such as consent decrees and corporate integrity agreements pursuant to which our activities would be subject to ongoing scrutiny and monitoring to ensure compliance with applicable laws and regulations. Additionally, if a regulatory agency discovers previously unknown problems with a product, such as adverse events of unanticipated severity or frequency, or problems with the facility where the product is manufactured, or disagrees with the promotion, marketing or labeling of a product, it may impose restrictions on that product, us or our partners, including requiring withdrawal of the product from the market. If we or our partners fail to comply with the regulatory requirements of the FDA and other U.S. and non-U.S. regulatory authorities, or if previously unknown problems with our products, manufacturers or manufacturing processes are discovered, the FDA or other regulatory authorities could impose significant penalties, such as:

- issuance of warning letters or untitled letters;
- imposition of injunctions or civil or criminal penalties;
- imposition of fines, restitution or disgorgement of profits or revenue;
- suspension or withdrawal of regulatory approval;
- restrictions on product distribution or use;
- imposition of total or partial suspension of production;
- suspension of any ongoing clinical trials;
- requirements to conduct post-marketing clinical trials;
- refusal to approve pending applications or supplements to applications;
- restrictions on the labeling or marketing of a product;
- imposition of restrictions on operations, including costly new manufacturing requirements; or
- seizure or detainment of products or requirements for us or our partners to initiate a product recall.

If we and our partners are not able to maintain regulatory compliance, we may not 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.

Our products may have undesirable side effects that may require them to be taken off the market or otherwise limit their sales.

Although NUZYRA and SEYSARA have undergone safety testing in humans and in laboratory animals, not all adverse effects of drugs can be predicted or anticipated from these clinical studies and preclinical safety and toxicology studies. Unforeseen side effects from either NUZYRA or SEYSARA could arise after the approved product has been marketed. Many of the most widely used antibiotics are associated with treatment-limiting adverse events, including in some instances, kidney damage, allergic reactions or sudden cardiovascular death due to cardiac arrhythmia. The results of future clinical trials or from marketing experience may show that NUZYRA or SEYSARA, or any other current or future product candidate, cause undesirable or unacceptable side effects. Furthermore, even though both NUZYRA and SEYSARA have received marketing approval, if we or others later identify undesirable or unacceptable side effects caused by NUZYRA or SEYSARA:

- regulatory authorities may require the addition of labeling statements, specific warnings, a contraindication or field alerts to physicians and pharmacies;
- we or our partners may be required to change the way the product is administered, conduct additional clinical trials or change the labeling of the product;
- we or our partners may be subject to limitations on how we may promote the product;
- sales of the product may decrease significantly;
- regulatory authorities may withdraw approvals of an approved product, or otherwise require us or our partners to take our approved product off the market, or impose restrictions on its distribution;
- we or our partners may be subject to litigation or product liability claims and be held liable for harm caused to patients; and
- our reputation may suffer.

Any of these events could prevent us, our current partners or our potential future partners from achieving or maintaining market acceptance of the affected product or could substantially increase commercialization costs and expenses, which in turn could delay or prevent us from generating significant revenue from the sale of our products. Furthermore, NUZYRA and SEYSARA are commercially available and each may be used in a wider population and in a less rigorously controlled environment than in clinical studies. As a result, regulatory authorities, healthcare practitioners, third-party payors or patients may perceive or conclude that the use of the product is associated with previously unknown serious adverse effects, undermining commercialization efforts.

Coverage and reimbursement decisions by third-party payors may have an adverse effect on pricing and market acceptance. If there is not sufficient coverage and reimbursement for our products, it is less likely that our products will be widely used.

Market acceptance and sales of NUZYRA, SEYSARA and any of our or our partners' other products will depend on coverage and reimbursement policies. Government authorities and third-party payors, such as private health plans, decide which drugs they will cover and establish reimbursement levels. Coverage and reimbursement may vary among third-party payors. Coverage may not be available, and reimbursement may not be adequate, for NUZYRA, SEYSARA or any other products that we or our partners develop and commercialize. Also, coverage and reimbursement policies may reduce the demand for, or the price paid for, our or our partners' products. Patients who are prescribed medications for the treatment of their conditions, and their prescribing physicians, generally rely on third-party payors to reimburse all or part of the costs associated with their prescription drugs. Patients are unlikely to use our or our partners' products unless coverage is provided, and reimbursement is adequate to cover a significant portion of the cost of such products. Therefore, if coverage is not available or reimbursement is limited, we and our partners may not be able to successfully commercialize NUZYRA, SEYSARA or any future approved products, if any.

Third-party payors may limit coverage or impose conditions on coverage. For example, third-party payors may limit coverage to specific drug products on an approved list, also known as a formulary, which might not include all of the FDA-approved drugs for a particular indication. As another example, third-party payors may require use of alternative therapies or a demonstration that a product is medically necessary for a particular patient before use of a product will be covered. A decision by a third-party payor not to cover our products could reduce utilization of those products.

A third-party payor's decision to provide coverage for a drug product does not imply that an adequate reimbursement rate or patient copayment will be at an acceptable level for physicians to choose to prescribe our drug. In addition, pharmaceutical companies often need to offer third party payors rebates and administration fees on the cost of drugs dispensed to the payors' members in order to increase the possibility of favorable coverage and adequate cost sharing thresholds for patients. We may be required to provide such rebates to some third-party payors in relation to our product(s). Adequate third-party reimbursement, taking into account such rebates as applicable, may not be available and we may not be able to maintain price levels sufficient to realize an appropriate profit, including a return on our investment in product development.

Outside of the United States, in some countries, the pricing of prescription drugs is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take a significant amount of time after receipt of marketing approval for a product. In addition, there can be considerable pressure by governments and other stakeholders on prices and reimbursement levels, including as part of cost containment measures. In some countries, we or our partners may be required to conduct a clinical trial or other studies that compare the cost-effectiveness of our product candidates to other available products in order to obtain or maintain reimbursement or pricing approval. If reimbursement of our products is unavailable or limited in scope or amount, or if pricing is set at unsatisfactory levels, there could be a material adverse effect on our business.

Healthcare legislative reform measures may have a material adverse effect on our business and results of operations.

The United States and several foreign jurisdictions are considering, or have already enacted, a number of legislative and regulatory proposals to change the healthcare system in ways that could affect our or our partners' ability to sell approved products profitably. Among policymakers and payors in the United States and elsewhere, there is significant interest in promoting changes in healthcare systems with the stated goals of containing healthcare costs, improving quality and/or expanding access to healthcare. In the United States, the pharmaceutical industry has been a particular focus of these efforts and has been significantly affected by major legislative initiatives.

The U.S. government and individual states have aggressively pursued healthcare reform, as evidenced by the passage of the Healthcare Reform Act and the ongoing efforts to modify or repeal that legislation. The Healthcare Reform Act substantially changed the way healthcare is financed by both governmental and private insurers and contains a number of provisions that affect coverage and reimbursement of drug products and/or that could potentially reduce the demand for pharmaceutical products such as increasing drug rebates under state Medicaid programs for brand name prescription drugs and extending those rebates to Medicaid managed care and assessing a fee on manufacturers and importers of brand name prescription drugs reimbursed under certain government programs, including Medicare and Medicaid. Modifications have been implemented under the Trump Administration and additional modifications or repeal may occur. For instance, tax reform legislation was enacted at the end of 2017 that eliminated the individual health insurance mandate which is expected to increase the number of Americans without comprehensive health insurance. In December of 2018, a federal district court also found the ACA unconstitutional in its entirety, although the legislation remains operational pending appeals. Other aspects of healthcare reform, such as expanded government enforcement authority could also affect our business and are ongoing. See "*Government Regulation - Health Care and Other Reform*". We cannot predict the ultimate content, timing or effect of any changes to the Healthcare Reform Act or other federal and state reform efforts.

Additional legislative actions to control U.S. healthcare or other costs have passed. The Budget Control Act, as amended, resulted in the imposition of 2% reductions in Medicare (but not Medicaid) payments to providers in 2013 and will remain in effect through 2027 unless additional Congressional action is taken.

There is no assurance that federal or state healthcare reform or other legislative and regulatory initiatives will not adversely affect our business and financial results, and we cannot predict how future federal or state legislative, judicial or administrative changes relating to healthcare reform will affect our business.

In the United States there is increasing scrutiny of drug prices and federal or state reforms could impact our ability to establish what we believe is a fair price for our products, and ultimately diminish our revenue prospects.

Recently, there has been considerable public and government scrutiny in the United States of pharmaceutical pricing and proposals to address the perceived high cost of pharmaceuticals. There have also been several recent state legislative efforts to address drug costs, which generally have focused on increasing transparency around drug costs or limiting drug prices or price increases. Adoption of new legislation at the federal or state level could affect demand for, or pricing of, our product candidates, if approved for sale and could diminish our ability to establish what we believe is a fair price for our products, ultimately diminishing our revenue for our products.

If we fail to comply with our reporting and payment obligations under the Medicaid Drug Rebate Program or other governmental pricing programs in the United States, we could be subject to additional reimbursement requirements, penalties, sanctions and fines which could have a material adverse effect on our business, financial condition, results of operations and growth prospects.

We participate in the Medicaid Drug Rebate Program and a number of other federal and state government pricing programs in the United States in order to obtain coverage for NUZYRA by certain government healthcare programs. These programs generally require us to pay rebates or provide discounts to certain private purchasers or government payers in connection with our products when dispensed to beneficiaries of these programs. In some cases, such as with the Medicaid Drug Rebate Program, the rebates are based on pricing and rebate calculations that we report on a monthly and quarterly basis to the government agencies that administer the programs. The terms, scope and complexity of these government pricing programs change frequently. We may also have reimbursement obligations or be subject to penalties if we fail to provide timely and accurate information to the government, pay the correct rebates or offer the correct discounted pricing. Changes to the price reporting or rebate requirements of these programs would affect our obligations to pay rebates or offer discounts. Responding to current and future changes may increase our costs and the complexity of compliance, will be time-consuming, and could have a material adverse effect on our results of operations.

If we or our partners market products in a manner that violates fraud and abuse and other healthcare laws, or if we or our partners violate government price reporting laws, we or our partners may be subject to administrative civil and/or criminal penalties.

Within the United States, various state and federal healthcare laws restrict certain marketing practices in the pharmaceutical industry. When we or any of our partners market approved products, such as NUZYRA or SEYSARA, some of our or our partners' business activities could possibly be subject to challenge under one or more of these laws. The laws and regulations that may affect our ability to operate include:

- federal false claims, false statements and civil monetary penalties laws prohibiting, among other things, any person from knowingly presenting, or causing to be presented, a false claim for payment of government funds or knowingly making, or causing to be made, a false statement to get a false claim paid;
- federal healthcare program anti-kickback law, which prohibit, among other things, persons from soliciting, receiving or providing remuneration, directly or indirectly, to induce either the referral of an individual, for an item or service or the purchasing or ordering of a good or service, for which payment may be made under federal healthcare programs such as Medicare and Medicaid;
- federal anti-kickback prohibition known as Eliminating Kickbacks in Recovery Act or EKRA, enacted in 2018, which prohibits certain payments related to referrals of patients to certain providers (recovery homes, clinical treatment facilities and laboratories) and applies to services reimbursed by private health plans as well as government health care programs;
- the federal law known as HIPAA, which, in addition to privacy protections applicable to healthcare providers and other entities, prohibits executing a scheme to defraud any healthcare benefit program or making false statements relating to healthcare matters;
- the FDCA, which among other things, strictly regulates drug marketing, prohibits manufacturers from marketing such products for off-label use and regulates the distribution of samples;
- federal laws that require pharmaceutical manufacturers to report certain calculated product prices to the government or provide certain discounts or rebates to government authorities or private entities, often as a condition of reimbursement under government healthcare programs;
- the so-called "federal sunshine" law, which requires pharmaceutical and medical device companies to monitor and report certain financial interactions with certain healthcare providers to the federal government for re-disclosure to the public (the scope of which reportable interactions will increase for interactions occurring on or after 2021); and
- state law equivalents of the above federal laws, such as anti-kickback and false claims laws which may apply to items or services reimbursed by any third-party payor, including commercial insurers, state laws regulating interactions between pharmaceutical manufactures and healthcare providers, and state laws governing the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and often are not preempted by federal laws, thus complicating compliance efforts.

Efforts to ensure that our and our partners' business arrangements with third parties will comply with applicable healthcare laws and regulations may involve substantial costs. With the approval of NUZYRA and SEYSARA, we have become subject to an expanded number of these laws and have, and will need to continue, to expend resources to develop and implement policies and processes to promote ongoing compliance. Although we believe we currently maintain an appropriate compliance program, we cannot be certain that the program will adequately detect or prevent violations.

Many of these laws and their implementing regulations contain ambiguous requirements or require administrative guidance for implementation. Given the lack of clarity in laws and their implementation, our activities could be subject to challenge. It is possible that governmental authorities will conclude that our or our partners' business practices may not comply with current or future statutes, regulations or case law involving applicable fraud and abuse or other healthcare laws. If our or our partners' operations are found to be in violation of any of these laws or any other governmental regulations that may apply to us, we or our partners may be subject to significant civil, criminal and administrative penalties, including, without limitation, damages, fines, imprisonment, exclusion from participation in government healthcare programs, such as Medicare and Medicaid, and the curtailment or restructuring of our operations, which could significantly harm our business.

Pharmaceutical and other healthcare companies have been prosecuted under these laws for a variety of promotional and marketing activities, such as: providing free trips, free goods, sham consulting fees and grants and other monetary benefits to prescribers; reporting to pricing services inflated average wholesale prices that were then used by federal programs to set reimbursement rates; engaging in off-label promotion; and submitting inflated best price information to the Medicaid Drug Rebate Program to reduce liability for Medicaid rebates.

Outside of the United States, foreign laws may also regulate our activities, or those of our collaboration partners.

Europe has enacted a new data privacy regulation, the General Data Protection Regulation, with hefty enforcement penalties, a violation of which could subject us to significant fines.

In May 2018, a new privacy regime, the General Data Protection Regulation, or GDPR, took effect and is binding across all member states of the European Economic Area, or EEA. The GDPR increases our obligations with respect to clinical trials and other activities conducted in the EEA by expanding the definition of personal data to include coded data, and requiring changes to informed consent practices and more detailed notices. In addition, the GDPR increases the scrutiny that individuals or entities should apply to transfers of personal data from the EEA to countries that are considered to lack an adequate level of data protection, such as the United States. The GDPR imposes substantial fines for breaches of data protection requirements, which can be up to four percent of global turnover or 20 million Euros, whichever is greater, and it also confers a private right of action on data subjects for breaches of data protection requirements. Compliance with these directives will be a rigorous and time-intensive process that may increase our cost of doing business, and the failure to comply with these laws could subject us to significant fines.

Risks Related to Our Business

We are highly dependent on the commercial success of NUZYRA in the United States and, to a lesser extent, SEYSARA.

Our success is currently dependent on the successful commercialization of NUZYRA in the United States, which is also being developed by Zai in the Zai territory, and, to a lesser extent, SEYSARA, which Almirall has the rights to commercialize in the United States. We are not currently developing, and have no such plans to develop, any other product candidates, other than omadacycline for the treatment of UTIs, plague, anthrax, and other relevant clinical investigations. We may need additional financing or grants to fund development of any current or future product candidates.

The majority of our time, resources and effort are focused on the commercialization of NUZYRA and our ability to generate product revenues will depend heavily on the successful commercialization of NUZYRA, which will depend on, among other things, our ability to:

- maintain commercial manufacturing arrangements with third-party manufacturers;
- produce, through a validated process, sufficient quantities and inventory of NUZYRA to meet demand;
- build and maintain internal sales, distribution and marketing capabilities sufficient to generate commercial sales of NUZYRA;
- secure widespread acceptance of our product from physicians, healthcare payors, patients and the medical community;
- properly price and obtain coverage and adequate reimbursement of NUZYRA by governmental authorities, private health insurers, managed care organizations and other third-party payors;
- maintain compliance with ongoing FDA labeling, packaging, storage, advertising, promotion, recordkeeping, safety and other post-market requirements;
- manage our growth and spending as costs and expenses increase due to commercialization; and
- establish and maintain collaborations with third parties for the commercialization of NUZYRA in countries outside of the United States, such as our existing collaboration with Zai to develop, manufacture and commercialize omadacycline in the Zai territory, and such collaborators' ability to obtain regulatory and reimbursement approvals in such countries.

There are no guarantees that we will be successful in completing these tasks. In addition, we have begun, and will need to continue investing substantial financial and management resources to build out our commercial infrastructure and to recruit and train sufficient additional qualified marketing, sales and other personnel in support of our sales of NUZYRA.

Sales of NUZYRA and SEYSARA may be slow or limited for a variety of reasons including competing therapies or safety issues. If NUZYRA and SEYSARA are not successful in gaining broad commercial acceptance, our business would be harmed.

Sales of NUZYRA and SEYSARA are dependent on several factors including our and our partners' ability to educate and increase physician awareness of the benefits, safety and cost-effectiveness of NUZYRA and SEYSARA relative to competing therapies. The degree of market acceptance of NUZYRA and SEYSARA among physicians, patients, healthcare payors and the medical community depends on a number of factors, including:

- acceptable evidence of safety and efficacy;
- relative convenience and ease of administration;

- prevalence and severity of any adverse side effects;
- availability of alternative treatments;
- pricing, cost effectiveness and value propositions;
- effectiveness of our sales and marketing capability and strategies;
- ability to obtain sufficient third-party coverage and reimbursement;
- the clinical indications for which NUZYRA and SEYSARA are approved, as well as changes in the standard of care for their targeted indications;
- the continuing effectiveness of manufacturing and supply chain;
- warnings and limitations contained in the approved labeling for NUZYRA;
- warnings and limitations contained in the approved labeling for SEYSARA, including that efficacy of SEYSARA beyond 12 weeks and safety beyond 12 months have not been established;
- safety concerns with similar products marketed by others;
- the prevalence and severity of any side effects as a result of treatment with NUZYRA and SEYSARA;
- our ability to comply with FDA post-marketing requirements associated with the FDA approval of NUZYRA, including conducting and completing post-marketing studies; and
- the actual market-size for NUZYRA and SEYSARA, which may be larger or smaller than expected.

In addition, since NUZYRA and SEYSARA are subject to continual review by the FDA, there can be no assurance that newly discovered or developed safety issues will not arise. With the use of any newly marketed drug by a wider patient population, serious adverse events may occur from time to time that initially do not appear to relate to the drug itself. For example, any safety issues could cause us to suspend or cease marketing NUZYRA, cause us to modify how we market NUZYRA, and may subject us to substantial liabilities and adversely affect our revenues and financial condition. In the event of a withdrawal of NUZYRA from the market, our revenues would decline significantly, and our business would be seriously harmed and could fail. We and our partners additionally may experience significant fluctuations in sales of NUZYRA and SEYSARA from period to period and, ultimately, we may never generate sufficient revenues from NUZYRA and SEYSARA to reach or maintain profitability or sustain our anticipated operations.

We face significant competition and if our competitors develop and market products that are more effective, safer or less expensive than our products, our commercial opportunities will be negatively impacted.

The life sciences industry is highly competitive and subject to rapid and significant technological change, including but not limited to with respect to innovations related to diagnostic devices. NUZYRA and SEYSARA will compete with other drugs and therapies that currently exist or are being developed. Products that we may develop in the future are also likely to face competition from other drugs and therapies, some of which we may not currently be aware. We have competitors both in the United States and internationally, including major multinational pharmaceutical companies, established biotechnology companies, specialty pharmaceutical companies, universities and other research institutions. Many of our competitors have significantly greater financial, manufacturing, marketing, drug development, technical and human resources than we do. Large pharmaceutical companies, in particular, have extensive experience in clinical testing, obtaining regulatory approvals, recruiting patients and manufacturing pharmaceutical products. These companies also have significantly greater research, development and marketing capabilities than we do and may also have products that have been approved or are in late stages of development, and collaborative arrangements in our target markets with leading companies and research institutions. Established pharmaceutical companies may also invest heavily to accelerate discovery and development of novel compounds or to in-license novel compounds to in-license novel compounds or develop technologies, that could make the product candidates that we develop obsolete or less competitive. As a result of all of these factors, our competitors may succeed in obtaining patent protection and/or regulatory approvals or discovering, developing and commercializing competing technologies before we do so for any of our product candidates.

The GAIN Act is intended to provide incentives for the development of new Qualified Infectious Disease Products. These incentives may result in more competition in the market for new antibiotics and may cause pharmaceutical and biotechnology companies with more resources than we have to shift their efforts toward the development of products that could be competitive with our product candidates.

NUZYRA competes with other antibiotics in the serious bacterial skin infection market. These include, but are not limited to, vancomycin, marketed as a generic by Abbott Laboratories and others; linezolid, marketed as Zyvox by Pfizer Inc. and available as a generic; daptomycin, marketed as Cubicin by Merck Pharmaceuticals, Inc. and available as a generic; dalbavancin, approved in May 2014 and marketed as Dalvance by Allergan; tedizolid, marketed as Sivextro by Merck Pharmaceuticals, Inc.; Baxdela approved in October 2017 and marketed by Melinta Therapuetics, Inc.; oritavancin, approved in August 2014 and marketed as Orbactiv by Melinta Therapeutics, Inc.; quinupristin/dalfopristin, marketed as Synercid by Pfizer, Inc.; tigecycline, marketed as Tygacil by Pfizer Inc. and available as a generic; telavancin, marketed as Vibativ by Theravance, Inc.; ceftaroline, marketed as Teflaro by Allergan; and the following generics: trimethoprim/sulfamethoxazole, clindamycin minocycline, doxycycline, and tetracycline. We are also aware of various drugs that are or may eventually be under development for the treatment of serious skin infections, and these include but are not limited to: Iclaprim by Motif Bio and Lefamulin by Nabriva.

NUZYRA will competes with other antibiotics in the community-acquired pneumonia market. These include, but are not limited to, azithromycin, marketed as Zithromax and Z-PAK by Pfizer Inc. and available as a generic; clarithromycin, marketed as Biaxin by Abbott Laboratories and available as a generic; moxifloxacin, marketed as Avelox by Bayer AG and available as a generic; levofloxacin, marketed as Levaquin by Johnson & Johnson and available as a generic; tigecycline, marketed as Tygacil by Pfizer Inc. and available as a generic; linezolid, marketed as Zyvox by Pfizer Inc. and available as a generic; ceftriaxone, marketed as Rocephin by F. Hoffman-La Roche Ltd and available as a generic; and ceftaroline, marketed as Teflaro by Allergan. We are also aware of various drugs that are or may eventually be under development for the treatment of CABP, including, but not limited to, delafloxacin and radezolid, under development by Melinta Therapeutics; GSK2140944, under development by GSK; and lefamulin, under development by Nabriva Therapeutics.

A number of competitors also exist in the UTI indication. If omadacycline is approved by the FDA for the UTI indication, generic potential competitors include, but are not limited to, levofloxacin, ciprofloxacin, trimethoprim/sulfamethoxazole, ceftriaxone and amoxicillin/clavulanic acid. Several branded and generic injectable-only antibiotics are also used in hospitals, including imipenem/cilastatin, piperacillin/tazobactam, and gentamicin. We are also aware of several other new oral antibiotics under development for the treatment of UTI infections.

Finally, SEYSARA faces competition in the acne markets where generic tetracyclines such as doxycycline and minocycline are available in every market around the world. Branded generic versions of tetracycline derivatives are sold by several companies.

Many of our competitors have substantially greater financial, technical and human resources than we do, as well as greater experience in the marketing of products, discovery and development of product candidates, obtaining FDA and other regulatory approvals of products and the commercialization of those products. Our competitors' drugs may be more effective, or more effectively marketed and sold, than NUZYRA, SEYSARA or any other product candidate we may commercialize and may render NUZYRA, SEYSARA or our other product candidates obsolete or non-competitive before we can recover the expenses of our development and commercialization. We anticipate that we will face intense and increasing competition as new drugs enter the market and advanced technologies become available. Finally, the development of new treatment methods for the diseases we are targeting could render NUZYRA, SEYSARA or our other product candidates non-competitive or obsolete.

In addition, many universities and private and public research institutes may become active in our target indications. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large, established companies.

We believe that our ability to successfully compete will depend on, among other things:

- the efficacy, safety and reliability of NUZYRA, SEYSARA and our and our partners' other product candidates, including as relative to marketed products and product candidates in development by third parties;
- our and our partners' ability to reliably manufacture any of our formulations;
- the speed at which we and our partners develop future product candidates;
- our and our partners' ability to commercialize and market, or find partners to help or exclusively commercialize and market, NUZYRA, SEYSARA or any future product candidates that receive regulatory approval;
- our and our partners' ability to design and successfully execute appropriate clinical trials, as well as the results of such clinical trials, including our two Phase 2 registration clinical trials for omadacycline-one in cystitis, a common uncomplicated UTI, and one in acute pyelonephritis, a common complicated UTI;
- our and our partners' ability to recruit and enroll patients for our and our partners' clinical trials;
- our and our partners' ability to maintain a productive relationship with regulatory authorities;

- the timing and scope of regulatory approvals;
- the effectiveness of our, our current partners' or any future partners' marketing and sales capabilities;
- the price of our products, including in comparison to branded or generic competitors;
- coverage and adequate levels of reimbursement under private and governmental health insurance plans, including Medicare;
- our and our partners' ability to protect and maintain intellectual property rights related to NUZYRA, SEYSARA and any of our or their other product candidates;
- our and our partners' ability to manage our growth and spending as costs and expenses increase due to commercialization of NUZYRA and SEYSARA;
- our and our partners' ability to maintain compliance with ongoing FDA labeling, packaging, storage, advertising, promotion, recordkeeping, safety and other post-market requirements, including required post-marketing studies;
- our and our partners' ability to manufacture and sell commercial quantities at a reasonable cost of NUZYRA and SEYSARA; and
- acceptance of NUZYRA and SEYSARA by physicians and other healthcare providers.

In addition, the biopharmaceutical industry is characterized by rapid technological change. If we fail to stay at the forefront of technological change, we may be unable to compete effectively. Technological advances or products developed by our competitors may render our technologies or product candidates obsolete, less competitive or not economical.

Furthermore, price competition may inhibit the acceptance of our products, physicians may be reluctant to switch from existing products to our products, physicians may switch to other newly approved drug products, or physicians may choose to reserve our products for use in limited circumstances.

We rely and will continue to rely on outsourcing arrangements for manufacturing of NUZYRA and any future product candidates. Reliance on third- party manufacturers could impair the commercialization of NUZYRA or delay approval of any future product candidates.

We do not currently own or operate manufacturing facilities for the production of NUZYRA or any other product candidate, nor do we currently intend to manufacture NUZYRA or any other pharmaceutical products that we may plan to sell in the future. We currently depend on third-party contract manufacturers for the supply of the active pharmaceutical ingredients for NUZYRA. We have entered into certain long-term manufacturing and supply agreements. These include (i) a manufacturing and services agreement with CIPAN for the supply of starting materials for our supply of omadacycline and crude omadacycline, (ii) an outsourcing agreement with Carbogen for the supply of active pharmaceutical ingredient for our omadacycline products, (iii) a manufacturing and services agreement with Almac for the supply of omadacycline oral solid dosage tablets, (iv) a manufacturing and services agreement with Patheon under which Patheon will manufacture, package and supply to us, omadacycline in injectable form and (v) a third party logistics provider agreement with ICS (Amerisource Bergan Co.) under which ICS will perform distribution and logistics services. We are currently in discussions with other third-party manufacturers and may enter into additional long-term supply agreements with them. We may not be able to reach agreement with some of these contract manufacturers, or to identify and reach arrangement on satisfactory terms with other contract manufacturers, to manufacture NUZYRA or any future product candidates. Additionally, we anticipate that the facilities used by any contract manufacturer to manufacture NUZYRA or any future product candidates will be the subject of inspections by regulatory agencies before the FDA and other regulatory authorities that approve an NDA or marketing authorization for the product candidate manufactured at that facility. We will depend on these third-party manufacturing partners for compliance with the FDA's manufacturing requirements for finished products. If our manufacturers cannot successfully manufacture material that conforms to our specifications and the FDA and other regulatory authorities' cGMP requirements, our future product candidates may not be approved or, in the case of NUZYRA, may be subject to delays in release and/or product recalls. While third-party manufacturers of NUZYRA have previously passed FDA and other regulatory agency inspections, we cannot provide assurance that they will pass such inspections in the future.

Furthermore, any interruption of the development or operation of the manufacturing facilities due to, among other reasons, events such as order delays for equipment or materials, equipment malfunction, quality control and quality assurance issues, regulatory delays and possible negative effects of such delays on supply chains and expected timelines for product availability, production yield issues, shortages of qualified personnel, discontinuation of a facility or business or failure or damage to a facility by natural disasters, could result in the cancellation of shipments, loss of product in the manufacturing process or a shortfall in available NUZYRA, other product candidates or materials.

Reliance on third-party manufacturers entails risks to which we would not be subject if we manufactured products and product candidates ourselves, including:

- the possibility of a breach of the manufacturing agreements by the third parties because of factors beyond our control;
- the possibility of termination or nonrenewal of the agreements by the third parties before we are able to arrange for a qualified replacement third-party manufacturer;
- the possibility that third parties are unable to manufacture NUZYRA consistently in commercial quantities, at acceptable costs on expected timelines;
- the possibility that we may not be able to maintain or secure manufacturers or manufacturing capacity in a timely manner and on satisfactory terms in order to meet our manufacturing needs; and
- the possibility that the third parties may not be able to respond adequately to unexpected changes in demand forecasts that may result in either lost revenue or excessive inventory with decreasing shelf-life.

Any of these factors could cause the delay of commercialization of NUZYRA, delay the development and approval of any future product candidates, or cause us to incur higher costs or prevent us from commercializing any future product candidates successfully. Furthermore, if contract manufacturers fail to continuously meet FDA compliance standards or fail to deliver the required commercial quantities of finished product on a timely basis and at commercially reasonable prices, and we are unable to find one or more replacement manufacturers capable of production at a substantially equivalent cost, in substantially equivalent volumes and quality and on a timely basis, we would likely be unable to meet demand for our products and could lose potential revenue. It may take one or more years to establish an alternative source of supply and to have any such new source approved by the FDA or any other relevant regulatory authorities.

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

If the FDA or other applicable regulatory authorities approve generic products that compete with NUZYRA, SEYSARA or any of our or our partners' product candidates, or if existing generic antibiotics are viewed as being equally effective to NUZYRA, SEYSARA or any of our or our partners' product candidates, the sales of NUZYRA, SEYSARA or, if approved, such product candidates would be adversely affected.

Once an NDA or marketing authorization application outside of the United States is approved, the product covered thereby becomes a "listed drug" that can, in turn, be cited by potential competitors in support of approval of an ANDA in the United States. Agency regulations and other applicable regulations and policies provide incentives to manufacturers to create modified, non- infringing versions of a drug to facilitate the approval of an ANDA or other application for generic substitutes in the United States and in nearly every pharmaceutical market around the world. These manufacturers might only be required to conduct a relatively inexpensive study to show that their product has the same active ingredient(s), dosage form, strength, route of administration and conditions of use, or labeling, as our product candidate and that the generic product is bioequivalent to ours, meaning it is absorbed in the body at the same rate and to the same extent as our product candidate. These generic equivalents, which must meet the same quality standards as branded pharmaceuticals, would be significantly less costly than ours to bring to market, and companies that produce generic equivalents are generally able to offer their products at lower prices. Thus, after the introduction of a generic competitor, a significant percentage of the sales of any branded product is typically lost to the generic product. Accordingly, competition from generic equivalents to ours or any of our partners' future products, if any, would materially adversely impact our future revenue, profitability and cash flows and substantially limit our ability to obtain a return on the investments we have made in our or any of our partners' products, including NUZYRA and SEYSARA. For example, vancomycin has been available in generic form for many years, and Zyvox (linezolid) is now available in generic form. We cannot yet ascertain what impact these generic products and any future approved generic products will have on sales of NUZYRA, SEYSARA or, if approved, any of our or our partners' product candidates.

The success of our business may be dependent on the actions of our collaborative partners.

An element of our business and funding strategy is to enter into collaborative arrangements with established pharmaceutical and biotechnology companies who will finance or otherwise assist in the development, manufacture and marketing of products incorporating our technology, and who also provide us with funding in the form of milestone payments for progress in clinical development or regulatory approval. For example, we exclusively licensed rights to sarecycline for the treatment of acne in the United States to Allergan, who assigned such rights to Almirall, and Almirall is responsible for all clinical development, registration and commercialization in the United States of sarecycline for the treatment of acne. In addition, Almirall has an exclusive license to

develop and commercialize sarecycline for the treatment of rosacea in the United States, which converted to a non-exclusive license in December 2014 after Allergan did not exercise its development option with respect to rosacea. In April 2017, Paratek Bermuda Ltd., a wholly-owned subsidiary of Paratek Pharmaceuticals, Inc., entered into the Zai Collaboration Agreement, pursuant to which we granted Zai an exclusive license to develop, manufacture and commercialize omadacycline in the Zai territory for all human therapeutic and preventative uses other than biodefense. Zai is responsible for the development, manufacturing and commercialization of the licensed product in the Zai territory, at its sole cost with certain assistance from Paratek Bermuda Ltd.

Accordingly, our prospects will depend in part upon our ability to attract and retain collaborative partners and to develop technologies and products that achieve the criteria for milestone payments. When we collaborate with a third party for development and commercialization of a product candidate, we can expect to relinquish some or all of the control over the future success of that product candidate to the third party in the respective territory. In addition, our collaborative partners may have the right to abandon research or development projects and terminate applicable agreements, including funding obligations, prior to or upon the expiration of the agreed upon terms. We may not be successful in establishing or maintaining collaborative arrangements on acceptable terms or at all, collaborative partners may terminate funding before completion of projects, our product candidates may not achieve the criteria for milestone payments, our collaborative arrangements may not result in successful product commercialization, and we may not derive any revenue from such arrangements. For example, we previously entered into a license and collaboration agreement with Novartis for the development of omadacycline, which was terminated. To the extent that we are not able to develop and maintain collaborative arrangements, we would need substantial additional capital to undertake research, development and commercialization activities on our own, we may be forced to limit the number of our product candidates we can commercially develop or the territories in which we commercialize them, and we might fail to commercialize products or programs for which a suitable collaborator cannot be found.

Reliance on collaborative relationships poses a number of risks, including the following:

- our collaborators may not perform their obligations as expected or in compliance with applicable laws;
- the prioritization, amount and timing of resources dedicated by our collaborators to their respective collaborations with us is not under our control;
- some product candidates discovered in collaboration with us may be viewed by our collaborators as competitive with their own product candidates or products;
- our collaborators may elect not to proceed with the development of product candidates that we believe to be promising;
- disagreements with collaborators, including disagreements over proprietary rights, contract interpretation or the preferred course of development, might cause delays or termination of the research, development or commercialization of product candidates, might lead to additional responsibilities for us with respect to product candidates, or might result in litigation or arbitration, any of which would be time-consuming and expensive;
- some of our collaborators might develop independently, or with others, products that could compete with our products;
- a delay in the development timeline for omadacycline in the Zai territory would result in a potential loss of milestone payments and future royalties (if any) from the partnership under the Zai Collaboration Agreement; and
- if the rights to sarecycline in the United States are returned to us by Almirall, or the rights to omadacycline in the Zai territory returned to us by Zai, we will need to establish a new development and commercialization partnership to further sarecycline in the United States or omadacycline in the Zai territory. There can be no assurance that we would be able to find such a partner.

If we are not able to establish and sustain additional partnerships, we may have to alter our commercialization and development plans, which could harm our business.

We anticipate that we will require additional funding to support commercialization of NUZYRA and to continue the development of any other product candidates. For some of our product candidates, we may decide to collaborate with pharmaceutical and biotechnology companies for the development and potential commercialization of those product candidates, as we have done with Allergan for sarecycline in the United States (who assigned its rights to Almirall) and Zai for omadacycline in the Zai territory.

We face significant competition in seeking appropriate collaborators. Whether or not 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 similar regulatory authorities outside of the United States, the potential market for the product candidate, the costs and complexities of manufacturing and delivering such product

candidate to patients, the patent position protecting the product candidate, the potential of competing products, the need to seek licenses or sub-licenses to third-party intellectual property and industry and market conditions generally. The collaborator may also consider alternative product candidates or technologies and whether collaboration on an alternative product could be more attractive than a collaboration with us. We may also be restricted under future license agreements from entering into agreements on certain terms with potential collaborators. Collaborations are complex and time-consuming to negotiate and document. In addition, there have been a significant number of recent business combinations among large pharmaceutical companies that have resulted in a reduced number of potential future collaborators.

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, it may delay completion of development and potential commercialization of our products. If we elect to increase our expenditures to fund development, registration 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 product revenue.

Further, even if we are able to enter into collaborations, we must be able to sustain a mutually beneficial working relationship with our collaborators in order to achieve the intended benefits of those collaborations. In the past, certain of our collaborators, including Novartis, have terminated their partnering relationships with us due to delays and uncertainties in connection with the FDA regulatory pathway for approval of omadacycline for the ABSSSI and CABP indications. This past history may affect our ability to attract and enter into collaboration arrangements with future partners or collaborators.

We are currently building our sales and distribution infrastructure. If we are unable to develop our sales, marketing and distribution capability on our own or through collaborations with marketing partners, we will not be successful in commercializing NUZYRA or any other product candidates.

While we have entered into an arrangement with a third party to provide a contract field sales force, we currently are building the sales force and distribution capabilities within our organization. We are in the process of establishing a sales and marketing organization with technical expertise and supporting distribution capabilities to successfully commercialize NUZYRA, or to outsource this function to a third party. Both of these options can be expensive and time consuming. In addition, we may not be able to hire a sales force in the United States that is large enough or has adequate expertise in the medical markets that we intend to target. Any failure or delay in the development of our sales, marketing and distribution capabilities would adversely impact the commercialization of NUZYRA.

With respect to our existing products and future product candidates, we may choose to collaborate with third parties that have direct sales forces and established distribution systems, either to augment our own sales force and distribution systems or as an alternative to our own sales force and distribution systems. To the extent that we enter into co-promotion or other licensing arrangements, our product revenue and profitability may be lower than if we directly marketed or sold any approved products. In addition, any revenue we receive will depend in whole or in part upon the efforts of these third parties, which may not be successful and are generally not within our control. If we are unable to enter into these arrangements on acceptable terms or at all, we may not be able to successfully commercialize any approved products. If we are not successful in commercializing any approved products, either on our own or through collaborations with one or more third parties, our future product revenue will suffer, and we may incur significant additional losses.

We have limited experience in the sale, marketing or distribution of pharmaceutical products. To achieve commercial success for any approved product, we must either develop a sales and marketing organization or outsource these functions to third parties.

We will need to commit significant time and financial and managerial resources to maintain and further develop our marketing and sales force to ensure they have the technical expertise required to address any challenges we may face with the commercialization of NUZYRA.

Factors that may inhibit our efforts to maintain and develop our commercialization capabilities include:

- an inability to retain an adequate number of effective commercial personnel in the medical markets we intend to target;
- an inability to train sales personnel, who may have limited experience with our company or NUZYRA, to deliver a consistent message regarding NUZYRA and be effective in convincing physicians to prescribe NUZYRA;
- a 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;

- an inability to equip sales personnel with effective materials, including medical and sales literature to help them educate physicians and our healthcare providers regarding NUZYRA and its proper administration; and
- unforeseen costs and expenses associated with maintaining and further developing an independent sales and marketing organization.

If we are not successful in establishing and maintaining an effective sales and marketing infrastructure, we will have difficulty commercializing NUZYRA and our future product revenue will suffer, which would adversely affect our business and financial condition.

If we enter into arrangements with third parties to perform sales, marketing and distribution services, our product revenues or the profitability of these product revenues to us are likely to be lower than if we were to market and sell any products that we develop ourselves. In addition, we likely will have little control over such third parties, and any of them 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 NUZYRA.

If we are unable to establish and maintain our agreements with third parties to distribute NUZYRA to patients, our results of operations and business could be adversely affected.

We rely on third parties to commercially distribute NUZYRA to patients. We have contracted with a third-party logistics company to warehouse NUZYRA and to process and ship customer orders, and are negotiating contracts with specialty pharmacies and specialty distributors to sell and distribute NUZYRA. The specialty pharmacies sell NUZYRA directly to patients and provide patient education and ongoing management. The specialty distributors sell NUZYRA to hospitals and other large buying institutions. We have also contracted with a third-party patient services hub to help us with some or all of the following: benefits investigation and reimbursement adjudication support, patient assistance programs and ongoing compliance support. This distribution network will require significant coordination with our sales and marketing and finance organizations. In addition, failure to coordinate financial systems could negatively impact our ability to accurately report product revenue from NUZYRA. If we are unable to effectively manage the distribution process, the commercial launch and sales of NUZYRA, as well as any future products we may commercialize, sales could be delayed or severely compromised and our results of operations may be harmed.

In addition, the use of specialty pharmacies, specialty distributors and a third-party patient services hub involves certain risks, including, but not limited to, risks that these organizations will:

- not provide us with accurate or timely information regarding their inventories, the number of patients who are using NUZYRA or serious adverse reactions, events and/or product complaints regarding NUZYRA;
- not effectively sell or support NUZYRA, or communicate publicly concerning NUZYRA in a manner that is contrary to FDA rules and regulations;
- reduce or discontinue their efforts to sell or support NUZYRA;
- not devote the resources necessary to sell NUZYRA in the volumes and within the time frame we expect;
- be unable to satisfy financial obligations to us or others; or
- cease operations.

Any such events may result in decreased product sales and lower product revenue, which would harm our results of operations and business. Additionally, the provision of patient support services, although fairly typical in the pharmaceutical industry, can be subject to challenge under fraud and abuse or FDA laws if not structured appropriately.

Independent clinical investigators and CROs that we engage to conduct our clinical trials may not devote sufficient time or attention to our and our partners' clinical trials or be able to repeat their past success.

We expect to depend on independent clinical investigators and CROs to participate in and conduct our clinical trials, including our ongoing Phase 2 studies in UTI. CROs may also assist us and our partners in the collection and analysis of data. There is a limited number of third-party service providers that specialize or have the expertise required to achieve our business objectives. Identifying, qualifying and managing performance of third-party service providers can be difficult, time consuming and cause delays in our or our partners' development programs. These investigators and CROs will not be our employees, and we will not be able to control, other than by contract, the amount of resources, including time, that they devote to our product candidates and clinical trials. If independent investigators fail to devote sufficient resources to the development of our product candidates, or if their performance is substandard, it may delay or compromise the prospects for approval and commercialization of any product candidates that we and our partners

develop. In addition, the use of third-party service providers requires us to disclose our proprietary information to these parties, which could increase the risk that this information will be misappropriated. Further, the FDA requires that we and our partners comply with standards, commonly referred to as current Good Clinical Practices, for conducting, recording and reporting clinical trials to assure that data and reported results are credible and accurate and that the rights, safety, integrity and confidentiality of clinical trial subjects are protected. Failure of clinical investigators or CROs to meet their obligations to us or comply with current Good Clinical Practices could adversely affect the clinical development of our product candidates and harm our business.

If NUZYRA or SEYSARA do not achieve broad market acceptance among physicians, patients, the medical community and third-party payors, our revenue generated from their sales will be limited.

The commercial success of NUZYRA and SEYSARA will depend upon their level of market acceptance among physicians, patients and the medical community. The degree of market acceptance of NUZYRA and SEYSARA will depend on a number of factors, including:

- limitations or warnings contained in the product's FDA or foreign regulatory approved labeling;
- changes in the standard of care for the targeted indications for any of our products;
- limitations in the approved clinical indications for our products;
- demonstrated clinical safety and efficacy compared to other products;
- lack of significant adverse side effects;
- sales, marketing, reimbursement and distribution support;
- availability of coverage and adequate reimbursement from governmental or private third-party payors, such as Medicare or managed care plans;
- the extent to which government or third-party payors implement utilization management techniques, such as unreasonably high copayment formulary tiers, prior authorization or quantity limits for our product(s), or even refuse to provide coverage or adequate reimbursement for the products;
- timing of market introduction and perceived effectiveness of competitive products;
- the degree of cost-effectiveness and value of our products;
- availability of alternative therapies at similar or lower cost, including generics and over-the-counter products;
- the extent to which the product is approved for inclusion on formularies of hospitals, and third-party payors, including managed care organizations;
- whether the product is designated under physician treatment guidelines as a therapy for particular infections;
- whether the product is designated under national treatment or formulary guidelines;
- adverse publicity about our products or favorable publicity about competitive products;
- convenience and ease of administration of our products; and
- potential product liability claims.

Although we believe our clinical studies demonstrate that NUZYRA and SEYSARA represent clinically meaningful and efficacious options for patients and physicians, it is possible that as we receive data from additional clinical trials or in a post-market setting from physician and patient experiences with the commercial products that do not continue to support such interpretations. It is also possible that the FDA, physicians and third-party payors will not agree with our interpretation of our existing and future clinical trial data. If we are unable to demonstrate the value of NUZYRA and SEYSARA based on our data, our opportunity for these products to maintain premium pricing and be commercialized successfully would be adversely affected. If NUZYRA or SEYSARA do not achieve an adequate level of acceptance by physicians, patients and the medical community, we and our partners may not generate sufficient revenue from these products, and we may not become or remain profitable. In addition, efforts to educate the medical community and third-party payors on the benefits of NUZYRA, SEYSARA or our product candidates may require significant resources and may never be successful.

Even though NUZYRA and SEYSARA have been approved for marketing in the United States, we or our partners may never obtain approval of or commercialize NUZYRA or SEYSARA outside of the United States, which would limit our ability to realize their full market potential.

In October 2018, the FDA approved NUZYRA in the United States for the treatment of adults with CABP and ABSSSI that are proven or strongly suspected to be caused by susceptible bacteria. We have global commercial rights to omadacycline, except that we have entered into a collaboration with Zai to develop, manufacture and commercialize omadacycline in the Zai territory. In October 2018, the FDA also approved SEYSARA for the treatment of inflammatory lesions of non-nodular moderate to severe acne vulgaris in patients nine years of age and older. In the United States, Almirall has the rights to commercialize SEYSARA, whereas we retain all ex-U.S. rights to sarecycline. In the future, we, or our partners, may seek to commercialize omadacycline or sarecycline in countries outside of the United States.

In order to market products outside of the United States, we and our partners must comply with numerous and varying regulatory requirements of other jurisdictions regarding safety and efficacy. Approval procedures vary among jurisdictions and can involve product testing and administrative review periods different from, and greater than, those in the United States. For example, we are seeking approval of omadacycline in Europe for the treatment of CABP and ABSSSI, and on October 4, 2018, we announced the acceptance of our submission to European Medicines Agency of the MAA for omadacycline.

Clinical trials conducted in one country may not be accepted by regulatory authorities in other countries, and regulatory approval in one country does not mean that regulatory approval will be obtained in any other country. Approval procedures vary among countries and can involve additional product testing and validation and additional administrative review periods. Seeking foreign regulatory approvals could result in significant delays, difficulties and costs for us and may require additional preclinical studies or clinical trials. Satisfying these and other regulatory requirements is costly, time consuming, uncertain and subject to unanticipated delays. In addition, our failure to obtain regulatory approval in any country may delay or have negative effects on the process for regulatory approval in other countries.

Regulatory approval in one jurisdiction does not ensure regulatory approval in another, but failure or delay in obtaining regulatory approval in one jurisdiction may have a negative effect on the regulatory process in others. Failure to obtain regulatory approvals in other jurisdictions or any delay or setback in obtaining such approvals could adversely affect our business and financial condition.

Bacteria might develop resistance to any of our antibiotic product candidates, which would decrease the efficacy and commercial viability of those product candidates.

Antibiotic resistance is primarily caused by the genetic mutation of bacteria resulting from suboptimal exposure to antibiotics where the drug does not eradicate all of the bacteria. While antibiotics have been developed to treat many of the most common infections, the extent and duration of their use worldwide has resulted in new mutated strains of bacteria resistant to current treatments. NUZYRA has been developed to treat patients infected with drug-resistant bacteria. If physicians, rightly or wrongly, associate the resistance issues of older generations of tetracyclines with NUZYRA, physicians might not prescribe NUZYRA for treating a broad range of infections. In addition, bacteria might develop resistance to NUZYRA if such bacteria are improperly dosed or treated repeatedly with NUZYRA over multiple years, causing the efficacy of NUZYRA to decline, which would negatively affect our potential to generate revenue from NUZYRA.

Our business and operations would suffer in the event of computer system failures.

Despite the implementation of security measures, our internal computer systems, and those of our CROs, our partners and other third parties on which we rely, are vulnerable to damage from computer viruses, unauthorized access, natural disasters, fire, terrorism, war and telecommunication and electrical failures. In addition, our systems safeguard important confidential personal data regarding our subjects. If a computer failure were to occur and cause interruptions in our operations, it could result in a material disruption of our drug development programs. For example, the loss of clinical trial data from completed, ongoing or planned clinical trials could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. To the extent that any disruption or security breach results in a loss of or damage to our data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur liability and the commercialization of NUZYRA and development other product candidates could be delayed.

If any product liability lawsuits are successfully brought against us or any of our collaborative partners, we may incur substantial liabilities and may be required to limit commercialization of our products, including NUZYRA and SEYSARA.

We face an inherent risk of product liability lawsuits related to the testing of our products in seriously ill patients and will face an even greater risk from sales of NUZYRA and SEYSARA. Product liability claims may be brought against us or our partners by participants enrolled in our clinical trials, patients, healthcare providers or others using, administering or selling any of our products. If we cannot successfully defend ourselves against any such claims, we may incur substantial liabilities. Regardless of merit or eventual outcome, liability claims may result in:

- decreased demand for NUZYRA or SEYSARA;
- injury to our reputation and significant negative media attention;
- withdrawal of clinical trial participants;
- termination of clinical trial sites or entire clinical trial programs;
- significant litigation costs;
- substantial monetary awards to or costly settlements with patients or other claimants;
- product recalls or a change in the indications for which they may be used;
- loss of revenue;
- diversion of management and scientific resources from our business operations; and
- the inability of us or our partners to successfully commercialize our products.

With the approval of NUZYRA and SEYSARA for commercial sale, we are highly dependent upon consumer perceptions of us and the safety and quality of our products. We could be adversely affected if we are subject to negative publicity. We could also be adversely affected if any of our products or any similar products distributed by other companies prove to be, or are asserted to be, harmful to patients. Also, because of our dependence upon consumer perceptions, any adverse publicity associated with illness or other adverse effects resulting from patients' use or misuse of our products or any similar products distributed by other companies could have a material adverse impact on our results of operations.

We currently hold $10.0 million in product liability insurance coverage in the aggregate annually, with a per incident limit of $10.0 million, which may not be adequate to cover all liabilities that we may incur. Insurance coverage is becoming increasingly expensive. As a result, we may be unable to maintain or obtain sufficient insurance at a reasonable cost to protect us against losses that could have a material adverse effect on its business. These liabilities could prevent or interfere with our product development and commercialization efforts. A successful product liability claim or series of claims brought against us, particularly if judgments exceed our insurance coverage, could decrease our cash resources and adversely affect our business, financial condition and results of operation.

If we fail to attract and retain key management and scientific personnel, we may be unable to successfully commercialize NUZYRA or develop our other product candidates.

Our industry has experienced a high rate of turnover of management personnel in recent years. We are to a certain extent dependent on the members of our senior management team for our business success. The employment agreements with our senior management team can be terminated by us or them at any time, with notice. The departure of any of our executive officers could result in a significant loss in the knowledge and experience that we, as an organization, possesses and could cause significant delays, or outright failure, in the execution of our strategies, the successful commercialization of NUZYRA, and the development of our other product candidates.

Our success depends in part on our continued ability to attract, retain and motivate highly qualified management, development and clinical personnel. We may not be able to attract or retain such qualified personnel due to the intense competition for qualified personnel among biotechnology, pharmaceutical and other businesses. If we are not able to attract and retain the necessary personnel to accomplish our business objectives, we may experience constraints that will impede significantly our development objectives and timelines, the success of our commercialization efforts, our ability to raise additional capital and our ability to implement our business strategy.

We depend on various consultants and advisors for the success and continuation of our development efforts.

We work extensively with various consultants and advisors, who provide advice and/or services in various business and development functions, including clinical development, operations and strategy, regulatory matters, legal and finance. The potential success of our drug development programs depends, in part, on continued successful collaborations with certain of these consultants and advisors. Our consultants and advisors are not our employees and may have commitments and obligations to other entities that may limit their availability to us. Typically, these advisors will not enter into non-compete agreements with us. If a conflict of interest arises between their work for us and their work for another entity, we may lose their services. We do not know if we will be able to maintain such relationships or that such consultants and advisors will not enter into other arrangements with competitors, any of which could have a detrimental impact on our development objectives and our business.

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

As of February 28, 2018, we had 104 full-time employees. With the FDA approval of NUZYRA, we expect to expand our employee base for managerial, operational, sales, marketing, financial and other resources. Future growth would impose significant added responsibilities on members of management, including the need to identify, recruit, maintain, motivate and integrate additional employees. Also, our management may need to divert a disproportionate amount of their attention away from our day-to-day activities and devote a substantial amount of time to managing these growth activities. We may not be able to effectively manage the expansion of our operations that may result in weaknesses in our infrastructure, give rise to operational mistakes, loss of business opportunities, loss of employees and reduced productivity among remaining employees. Our expected growth could require significant capital expenditures and may divert financial resources from other projects, such as the development of existing and additional product candidates. If our management is unable to effectively manage our expected growth, our expenses may increase more than expected, our ability to generate and/or grow revenue could be reduced and we may not be able to implement our business strategy. Our future financial performance and our ability to successfully commercialize NUZYRA, develop our other product candidates and compete effectively with others in our industry will depend, in part, on our ability to effectively manage any future growth.

Our and our partners' business may become subject to economic, political, regulatory and other risks associated with international operations.

Our business is subject to risks associated with conducting business internationally, in part due to a number of our suppliers and collaborative and clinical trial relationships being located outside of the United States. Accordingly, our future results could be harmed by a variety of factors, including:

- economic weakness, including inflation or political instability, in particular foreign economies and markets;
- differing regulatory requirements for drug approvals in foreign countries;
- differing regulatory requirements for drug product pricing and reimbursement;
- potentially reduced protection for intellectual property rights;
- difficulties in compliance with non-U.S. laws and regulations;
- changes in non-U.S. regulations and customs, tariffs and trade barriers;
- changes in non-U.S. currency exchange rates and currency controls;
- changes in a specific country's or region's political or economic environment;
- trade protection measures, import or export licensing requirements or other restrictive actions by U.S. or non-U.S. governments;
- negative consequences from changes in tax laws;
- compliance with tax, employment, immigration and labor laws for employees living or traveling abroad;
- workforce uncertainty in countries where labor unrest is more common than in the United States;
- difficulties associated with staffing and managing foreign operations, including differing labor relations;
- production shortages resulting from any events affecting raw material supply or manufacturing capabilities abroad; and
- business interruptions resulting from geo-political actions, including war and terrorism, or natural disasters, including earthquakes, typhoons, floods and fires.

These risks may materially adversely affect our ability to attain or sustain profitable operations.

If we do not comply with laws regulating the protection of the environment and health and human safety, our business could be adversely affected.

Our research and development involves the use of potentially hazardous materials and chemicals. Our operations may have produced hazardous waste products. Although we believe that our safety procedures for handling and disposing of these materials comply with the standards mandated by local, state and federal laws and regulations, the risk of accidental contamination or injury from these materials cannot be eliminated. We are also subject to numerous environmental, health and workplace safety laws and regulations and fire and building codes, including those governing laboratory procedures, exposure to blood-borne pathogens, use and storage of flammable agents and the handling of biohazardous materials. Although we have always maintained workers' compensation insurance as prescribed by the Commonwealths of Massachusetts and Pennsylvania to cover us for costs and expenses we may incur due to injuries to our employees resulting from the use of these materials, 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. Additional federal, state and local laws and regulations affecting our operations may be adopted in the future. We may incur substantial costs to comply with, and substantial fines or penalties if we violate, any of these laws or regulations.

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

We are exposed to the risk that our employees, contractors, partners, principal investigators, CROs, consultants and vendors may engage in fraudulent conduct or other illegal activity. Misconduct by these parties could include intentional, reckless and/or negligent conduct or disclosure of unauthorized activities to us that violates: FDA regulations, including those laws requiring the reporting of true, complete and accurate information to the FDA, federal and state healthcare fraud and abuse laws and regulations, laws that require the reporting of financial information or data timely, completely or 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 may restrict or prohibit a wide range of pricing, discounting, marketing and promotion, sales commission, customer incentive programs and other business arrangements. Third-party misconduct could also involve the improper use of information obtained in the course of clinical trials, which could result in regulatory sanctions and serious harm to our reputation. It is not always possible to identify and deter misconduct, 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. If any such actions are instituted against us resulting from this misconduct, 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 significant civil, criminal and administrative penalties, including, without limitation, damages, fines, imprisonment, exclusion from participation in government healthcare programs, such as Medicare and Medicaid, and the curtailment or restructuring of our operations, which could significantly harm our business.

We enter into various contracts in the normal course of our business in which we indemnify the other party to the contract. In the event we have to perform under these indemnification provisions, it could have a material adverse effect on our business, financial condition and results of operations.

In the normal course of business, we periodically enter into academic, commercial, service, collaboration, licensing, consulting and other agreements that contain indemnification provisions. With respect to our academic and other research agreements, we typically indemnify the institution and related parties from losses arising from claims relating to the products, processes or services made, used, sold or performed pursuant to the agreements for which we have secured licenses, and from claims arising from our or our sub licensees' exercise of rights under the agreement. With respect to our commercial agreements, we indemnify our vendors from any third-party product liability claims that could result from the production, use or consumption of the product, as well as for alleged infringements of any patent or other intellectual property right by a third party. With respect to consultants, we indemnify them from claims arising from the good faith performance of their services.

Should our obligation under an indemnification provision exceed applicable insurance coverage or if we were denied insurance coverage, our business, financial condition and results of operations could be adversely affected. Similarly, if we are relying on a collaborator to indemnify us and the collaborator is denied insurance coverage or does not have assets available to indemnify us, our business, financial condition and results of operations could be adversely affected.

We may be subject to damages resulting from claims that we or our employees have wrongfully used or disclosed alleged trade secrets of former employers.

Certain of our former employees were previously employed at universities or other biotechnology or pharmaceutical companies, including competitors or potential competitors. Although no claims against us are currently pending, we may be subject to claims that these employees or we ourselves inadvertently or otherwise used or disclosed trade secrets or other proprietary information. Litigation may be necessary to defend against these claims. If we fail in defending such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel. A loss of key research personnel or their work product could hamper or prevent us or a collaboration partner's ability to develop or commercialize certain potential products, which could severely harm the business. Even if we are successful in defending against these claims, litigation could result in substantial costs and be a distraction to management.

Risks Related to Our Intellectual Property

If we are unable to obtain and enforce patent protection for products, our product candidates and related technology, our business could be materially harmed.

Issued patents may be challenged, invalidated or circumvented. In addition, court decisions may introduce uncertainty in the enforceability or scope of patents owned by pharmaceutical companies. The legal systems of certain countries do not favor the aggressive enforcement of patents, and the laws of foreign countries may not allow us to protect our inventions with patents to the same extent as do the laws of the United States. Because patent applications in the United States and many foreign jurisdictions are typically not published until 18 months after filing, or in some cases not at all, and because publications of discoveries in scientific literature lag behind actual discoveries, or may not be the first to make the inventions claimed in issued patents or pending patent applications, or may not be the first to file for protection of the inventions set forth in our patents or patent applications. As a result, we may not be able to obtain or maintain protection for certain inventions. If such inventions or related inventions are successfully patented by others, we may be required to obtain licenses under third-party patents to market our product candidates, as described in greater detail below. Therefore, enforceability and scope of our patents in the United States and in foreign countries cannot be predicted with certainty, and, as a result, any patents that we own or license may not provide sufficient protection against competitors. We may not be able to obtain or maintain patent protection from our pending patent applications, from those we may file in the future, or from those we may license from third parties. Moreover, even if we are able to obtain patent protection, such patent protection may be of insufficient scope to achieve our business objectives, or may not survive legal or administrative challenges by competitors.

Our strategy depends on our ability to identify and seek and obtain patent protection for our discoveries. This process is expensive and time consuming, and we may not be able to file and prosecute successfully all necessary or desirable patent applications at a reasonable cost or in a timely manner or in all jurisdictions where protection may be commercially advantageous. Despite our efforts to protect our proprietary rights, unauthorized parties may be able to obtain and use information that we regard as proprietary. The issuance of a patent does not ensure that it is valid or enforceable, so even if we obtain patents, they may not be valid or enforceable against third parties. In addition, the issuance of a patent does not give us the right to practice the patented invention. Third parties may have blocking patents that could prevent us from marketing our own patented product and practicing our own patented technology. Third parties may also seek to market generic versions of any approved products by submitting ANDAs to the FDA in which they claim that patents owned or licensed by us are invalid, unenforceable and/or not infringed. Alternatively, third parties may seek approval to market their own products similar to or otherwise competitive with our products. In these circumstances, we may need to defend and/or assert our patents, including by filing lawsuits alleging patent infringement. In any of these types of proceedings, a court or other agency with jurisdiction may find our patents invalid and/or unenforceable. Even if we have valid and enforceable patents, these patents still may not provide protection against competing products or processes sufficient to achieve our business objectives.

The patent position of pharmaceutical or biotechnology companies, including ours, is generally uncertain and involves complex legal and factual considerations. The standards that the U.S. Patent and Trademark Office, or USPTO, and its foreign counterparts use to grant patents are not always applied predictably or uniformly and can change. There is also no uniform, worldwide policy regarding the subject matter and scope of claims granted or allowable in pharmaceutical or biotechnology patents. The laws of some foreign countries do not protect proprietary information to the same extent as do the laws of the United States, and many companies have encountered significant problems and costs in protecting their proprietary information in these foreign countries. Outside of the United States, patent protection must be sought in individual jurisdictions, further adding to the cost and uncertainty of obtaining adequate patent protection outside of the United States. Accordingly, additional patents protecting our technology may not issue in the United States or in foreign jurisdictions, and any patents that do issue may not have claims of adequate scope to provide competitive advantage. Moreover, third parties may be able to successfully obtain claims and such claims may be broad. The allowance of broader claims may increase the incidence and cost of patent interference proceedings, opposition proceedings and/or reexamination proceedings, the risk of infringement litigation and the vulnerability of the claims to challenge. On the other hand, the allowance of narrower claims does not eliminate the potential for adversarial proceedings and may fail to provide a competitive advantage. Our

issued patents may not contain claims sufficiently broad to protect us against third parties with similar technologies or products or provide us with any competitive advantage. Moreover, even after they have issued, our patents and any patent for which we have licensed or may license rights may be challenged, narrowed, invalidated or circumvented. If our patents are invalidated or otherwise limited or expire prior to the commercialization of our product candidates, other companies may be better able to develop products that compete with our products which could adversely affect our competitive business position, business prospects and financial condition. The following are examples of litigation and other adversarial proceedings or disputes that we could become a party to involving our patents or patents licensed to us:

- we or our partners may initiate litigation or other proceedings against third parties to enforce our patent rights;
- third parties may initiate litigation or other proceedings seeking to invalidate patents owned by or licensed to us or to obtain a declaratory judgment that their product or technology does not infringe our patents or patents licensed to us;
- third parties may initiate opposition or reexamination proceedings challenging the validity or scope of our patent rights, requiring us or our partners to participate in such proceedings to defend the validity and scope of our patents;
- there may be a challenge or dispute regarding inventorship or ownership of patents currently identified as being owned by or licensed to us;
- the USPTO may initiate an interference between patents or patent applications owned by or licensed to us and those of our competitors, requiring us or our collaborators to participate in an interference proceeding to determine the priority of invention, which could jeopardize our patent rights; or
- third parties may submit ANDAs to the FDA seeking approval to market generic versions of our approved or future approved products prior to expiration of relevant patents owned by or licensed to us, requiring us to defend our patents, including by filing lawsuits alleging patent infringement.

These lawsuits and proceedings would be costly and could adversely affect our results of operations and divert the attention of our managerial and scientific personnel. A court or administrative body may decide that our patents are invalid or not infringed by a third party's product or activity or that the scope of certain issued claims must be further limited. An adverse outcome in a litigation or proceeding involving our own patents could limit our ability to assert our patents against these or other competitors and may curtail or preclude our ability to exclude third parties from making and selling similar or competitive products. Any of these occurrences could adversely affect our competitive business position, business prospects and financial condition. An adverse outcome in a dispute involving inventorship or ownership of our patents could, for example, subject us to additional royalty obligations and expand the number of product candidates that are subject to the royalty and other obligations of our license agreement with Tufts.

The degree of future protection for our proprietary rights is uncertain because legal means afford only limited protection and may not adequately protect our rights or permit us to gain or keep our competitive advantage. For example:

- others may be able to develop a platform that is similar to, or better than, ours in a way that is not covered by the claims of our patents;
- others may be able to make compounds that are similar to our products or product candidates but that are not covered by the claims of our patents;
- we might not have been the first to make the inventions covered by our pending patent applications;
- we might not have been the first to file patent applications for these inventions;
- others may independently develop similar or alternative technologies or duplicate any of our technologies;
- we may be unable to effectively protect our trade secrets;
- any patents that we obtain may not provide us with any competitive advantages or may ultimately be found invalid or unenforceable;
- we may not develop additional proprietary technologies that are patentable; or
- the patents of others may have an adverse effect on our business.

Our commercial success depends significantly on our ability to operate without infringing the patents and other proprietary rights of third parties.

Our and our partners' success will depend in part on our ability to operate without infringing the proprietary rights of third parties. Other entities may have or obtain patents or proprietary rights that could limit our ability to manufacture, use, sell, offer for sale or import our products or impair our competitive position. Patent applications that we believe we do not infringe, but that we may ultimately be found to infringe, could be issued to third parties. In addition, to the extent that a third party develops new technology that covers our products or product candidates, we and our partners may be required to obtain licenses to that technology, which licenses may not be available or may not be available on commercially reasonable terms. Third parties may have or obtain valid and enforceable patents or proprietary rights that could block us from developing product candidates using our technology. Our failure to obtain a license to any technology that we require may materially harm our business, financial condition and results of operations. Moreover, our or our partners' failure to maintain a license to any technology that we requires may also materially harm our business, financial condition and results of operations. Furthermore, we would be exposed to a threat of litigation.

In the pharmaceutical industry, significant litigation and other proceedings regarding patents, patent applications, trademarks and other intellectual property rights have become commonplace. The types of situations in which we may become a party to such litigation or proceedings include:

- we or our partners may initiate litigation or other proceedings against third parties seeking to invalidate the patents held by those third parties or to obtain a judgment that our products or processes do not infringe those third parties' patents;
- if our competitors file patent applications that claim technology also claimed by us, we or our collaborators may be required to participate in interference or opposition proceedings to determine the priority of invention, which could jeopardize our patent rights and potentially provide a third party with a dominant patent position;
- if third parties initiate litigation claiming that our processes, products or use of products infringe their patent or other intellectual property rights, we and our collaborators will need to defend against such proceedings;
- if third parties initiate litigation claiming that our brand names infringe their trademarks, we and our collaborators will need to defend against such proceedings; and
- if a license to necessary technology is terminated, the licensor may initiate litigation claiming that our processes or products infringe or misappropriate their patent or other intellectual property rights and/or that we breached our obligations under the license agreement, and we and our collaborators would need to defend against such proceedings.

These lawsuits would be costly and could affect our results of operations and divert the attention of our managerial and scientific personnel. There is a risk that a court would decide that we or our partners are infringing the third party's patents and would order us or our collaborators to stop the activities covered by the patents. In that event, we or our partners may not have a viable alternative to the technology protected by the patent and may need to halt work on the affected product or product candidate. In addition, there is a risk that a court will order us or our partners to pay the other party damages. An adverse outcome in any litigation or other proceeding could subject us to significant liabilities to third parties and require us to cease using the technology that is at issue or to license the technology from third parties. We may not be able to obtain any required licenses on commercially acceptable terms or at all. Any of these outcomes could have a material adverse effect on our business.

The pharmaceutical and biotechnology industries have produced a significant number of patents, and it may not always be clear to industry participants, including us, which patents cover various types of products or methods of use. The coverage of patents is subject to interpretation by the courts, and the interpretation is not always uniform. If we are sued for patent infringement, we would need to demonstrate that our products or methods either do not infringe the patent claims of the relevant patent or that the patent claims are invalid, and we may not be able to do this. Proving invalidity is difficult. For example, in the United States, proving invalidity requires a showing of clear and convincing evidence to overcome the presumption of validity enjoyed by issued patents. Even if we are successful in these proceedings, we may incur substantial costs and divert management's time and attention in pursuing these proceedings, which could have a material adverse effect on us. If we are unable to avoid infringing the patent rights of others, we may be required to seek a license, defend an infringement action or challenge the validity of the patents in court. Patent litigation is costly and time consuming. We may not have sufficient resources to bring these actions to a successful conclusion. In addition, if we do not obtain a license, do not develop or obtain non-infringing technology, fail to defend an infringement action successfully or has infringed patents declared invalid, we may incur substantial monetary damages, encounter significant delays in bringing our product candidates to market and be precluded from manufacturing or selling our products.

The cost of any patent litigation or other proceeding, even if resolved in our favor, could be substantial. Some of our competitors may be able to sustain the cost of such litigation and proceedings more effectively than we can because of their substantially greater resources. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could have a material adverse effect on our ability to compete in the marketplace. Patent litigation and other proceedings may also absorb significant management time and financial resources. There are inherent risks and uncertainties associated with any litigation, including those involving intellectual property, which litigation and risks can be costly in of itself or create an environment making it challenging to raise additional capital.

If we or our partners fail to comply with our obligations under our intellectual property licenses with third parties, we could lose license rights that are important to our business.

We are currently party to an intellectual property license agreement with Tufts. The license agreement imposes, and we expect that future license agreements may impose, various diligence, milestone payment, royalty, insurance and other obligations on us. For example, we are required to use our best efforts to effect introduction of licensed products under the agreement into the United States commercial market. If we fail to comply with our obligations under the license, Tufts may have the right to terminate the license agreement, in which event we might not be able to market any product that is covered by the agreement, such as NUZYRA. Termination of the license agreement or reduction or elimination of our licensed rights may result in us having to negotiate a new or reinstated license with less favorable terms. If Tufts were to terminate its license agreement with us for any reason, our business could be materially harmed. In the event that we are unable to maintain the Tufts license, we may lose the ability to exclude third parties from offering substantially identical products for sale and may even risk the threat of a patent infringement lawsuit from our former licensor based on our continued use of its intellectual property. Either of these events could adversely affect our competitive business position and harm our business.

Under our license agreement with Tufts, we are responsible for prosecution and maintenance of the licensed patents and patent applications, including payment of necessary government fees. In the event that any of the licensed patents or patent applications unintentionally lapse or are otherwise materially diminished in value, our relationship with Tufts could be harmed. This could result in termination of the license, loss of the rights to control prosecution of the licensed patents and patent applications and/or liability to Tufts for any loss.

If we or our partners are unable to protect the confidentiality of our proprietary information and know-how, the value of our technology and products could be adversely affected.

In addition to patent protection, we also rely on other proprietary rights, including protection of trade secrets, know-how and confidential and proprietary information. To maintain the confidentiality of trade secrets and proprietary information, our policy is to enter into confidentiality agreements with our employees, consultants, collaborators and others upon the commencement of their relationships with us. These agreements require that all confidential information developed by the individual or made known to the individual by us during the course of the individual's relationship with us be kept confidential and not disclosed to third parties. Our agreements with employees and our personnel policies also provide that any inventions conceived by the individual in the course of rendering services to us shall be our exclusive property. However, we may not obtain these agreements in all circumstances, and individuals with whom we have these agreements may not comply with their terms. In the event of unauthorized use or disclosure of our trade secrets or proprietary information, these agreements, even if obtained, may not provide meaningful protection, particularly for our trade secrets or other confidential information. To the extent that our employees, consultants or contractors use technology or know-how owned by third parties in their work for us, disputes may arise between us and those third parties as to the rights in related inventions. To the extent that an individual who is not obligated to assign rights in intellectual property to us is rightfully an inventor of intellectual property, we may need to obtain an assignment or a license to that intellectual property from that individual. Such assignment or license may not be available on commercially reasonable terms or at all.

Adequate remedies may not exist in the event of unauthorized use or disclosure of our confidential information. The disclosure of our trade secrets would impair our competitive position and may materially harm our business, financial condition and results of operations. Costly and time consuming litigation could be necessary to enforce and determine the scope of our proprietary rights, and failure to obtain or maintain trade secret protection could adversely affect our competitive business position. In addition, others may independently discover trade secrets and proprietary information, and the existence of our own trade secrets affords no protection against such independent discovery.

As is common in the biotechnology and pharmaceutical industries, we employ individuals who were previously or concurrently employed at research institutions and/or other biotechnology or pharmaceutical companies, including our competitors or potential competitors. We may be subject to claims that these employees, or we, have inadvertently or otherwise used or disclosed trade secrets or other proprietary information of their former employers or that patents and applications we have filed to protect inventions of these employees, even those related to one or more of our product candidates, are rightfully owned by their former or concurrent employer. Litigation may be necessary to defend against these claims. Even if we are successful in defending against these claims, litigation could result in substantial costs and be a distraction to management.

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

Periodic maintenance fees, renewal fees, annuity fees and various other governmental fees on patents and/or applications will be due to the USPTO and various foreign patent offices at various points over the lifetime of the patents and/or applications. We have systems in place to remind us to pay these fees, and we rely on our outside counsel to pay these fees when due. Additionally, the USPTO and various foreign patent offices require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process. We employ reputable law firms and other professionals to help us comply, and in many cases, an inadvertent lapse can be cured by payment of a late fee or by other means in accordance with rules applicable to the particular jurisdiction. However, there are situations in which noncompliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. If such an event were to occur, it could have a material adverse effect on our business. In addition, we are responsible for the payment of patent fees for patent rights that we have licensed from other parties. If any licensor of these patents does not itself elect to make these payments, and we fail to do so, we may be liable to the licensor for any costs and consequences of any resulting loss of patent rights.

If we do not obtain protection under the Hatch-Waxman Amendments and similar foreign legislation by extending the term of patents covering each of our product candidates, our business may be materially harmed.

Based on the FDA marketing approval of our products, one or more of our U.S. patents may be eligible for limited patent term extension under the Hatch-Waxman Amendments. The Hatch-Waxman Amendments permit a patent term extension of up to five years for a patent covering an approved product as compensation for effective patent term lost during product development and the FDA regulatory review process, with the condition that this five year extension does not extend the patent for more than fourteen years from the approval date. However, we may not receive an extension if we fail to apply within applicable deadlines, fail to apply prior to expiration of relevant patents or otherwise fail to satisfy applicable requirements. Moreover, the length of the extension could be less than our request. If we are unable to obtain patent term extension or the term of any such extension is less than we request, the period during which we can enforce our patent rights for that product may not extend beyond the current patent expiration dates and our competitors may obtain approval to market competing products sooner. As a result, our revenue could be reduced, possibly materially.

Risks Related to the Notes

Servicing our debt, including the Notes, requires a significant amount of cash, and we may not have sufficient cash flow from our business to pay our substantial debt.

Our ability to make scheduled payments of the principal of, to pay interest on or to refinance our indebtedness, including the Notes, depends on our future performance, which is subject to regulatory, economic, financial, competitive and other factors beyond our control. We are a biopharmaceutical company that has not yet generated profit from product sales. We expect to continue to incur losses as we add infrastructure and personnel to support our commercialization and product development efforts and operations. Accordingly, our business may not generate cash flow from operations in the future sufficient to service our debt and make necessary capital expenditures. If we are unable to generate such cash flow, we may be required to adopt one or more alternatives, such as selling assets, restructuring debt or obtaining additional equity capital on terms that may be onerous or highly dilutive. Our ability to refinance our indebtedness will depend on the capital markets and our financial condition at such time. We may not be able to engage in any of these activities or engage in these activities on desirable terms, which could result in a default on our debt obligations.

The Notes are subordinated to our senior indebtedness, effectively subordinated to our secured indebtedness and structurally junior to any liabilities of our subsidiaries.

The Notes are our general, unsecured, senior subordinated obligations and rank equally in right of payment with all of our future unsecured, senior subordinated indebtedness; senior to all of our future subordinated indebtedness; junior to all of our existing and future senior indebtedness, whether or not secured; effectively subordinated to all of our secured indebtedness, including secured indebtedness under the Hercules Loan Agreement, as amended, to the extent of the value of the assets securing such indebtedness; and structurally junior to the liabilities, including trade payables, of our subsidiaries. In the event of our bankruptcy, liquidation, reorganization or other winding up, our assets that secure debt ranking senior in right of payment to the Notes will be available to pay obligations on the Notes only after the secured debt has been repaid in full from these assets, and the assets of our subsidiaries will be available to pay obligations on the Notes only after all claims senior to the Notes have been repaid in full. There may not be sufficient assets remaining to pay amounts due on any or all of the Notes then outstanding. The indenture governing the Notes does not prohibit us from incurring additional senior debt or secured debt, nor does it prohibit any of our subsidiaries from incurring additional liabilities.

Despite our current debt levels, we may still incur substantially more debt or take other actions which would intensify the risks discussed above.

Despite our current consolidated debt levels, we and our subsidiaries may be able to incur substantial additional debt in the future, subject to the restrictions contained in our debt instruments, some of which may be secured debt. We are not restricted under the terms of the indenture governing the Notes from incurring additional debt, securing existing or future debt, recapitalizing our debt or taking a number of other actions that are not limited by the terms of the indenture governing the Notes that could have the effect of diminishing our ability to make payments on the Notes when due. While the Hercules Loan Agreement, as amended, restricts our ability and the ability of our subsidiaries to issue or incur additional indebtedness, including secured indebtedness, if our loans under the Hercules Loan Agreement, as amended, mature or are repaid, we may not be subject to such restrictions under the terms of any subsequent indebtedness.

We may not have the ability to raise the funds necessary to repurchase the Notes upon a fundamental change, and our existing or future debt may contain limitations on our ability to repurchase the Notes.

Holders of the Notes have the right to require us to repurchase their Notes upon the occurrence of a fundamental change at a fundamental change repurchase price equal to 100% of the principal amount of the Notes to be repurchased, *plus* accrued and unpaid interest, if any. However, we may not have enough available cash or be able to obtain financing at the time we are required to make repurchases of Notes surrendered therefor. In addition, our ability to repurchase the Notes may be limited by law, by regulatory authority or by agreements governing our indebtedness that exist at the time of the repurchase. The Hercules Loan Agreement, as amended, currently limits our ability to repurchase the Notes. Our failure to repurchase Notes at a time when the repurchase is required by the indenture governing the Notes would constitute a default under the indenture. A default under the indenture or the fundamental change itself could also lead to a default under the Hercules Loan Agreement, as amended, and/or agreements governing our future indebtedness. If the repayment of the related indebtedness were to be accelerated after any applicable notice or grace periods, we may not have sufficient funds to repay the indebtedness and repurchase the Notes.

In addition, our borrowings under the Hercules Loan Agreement, as amended, are, and are expected to continue to be, at variable rates of interest and expose us to interest rate risk. If interest rates increase, our debt service obligations on the variable rate indebtedness would increase even though the amount borrowed remained the same, and our net income would decrease.

The Hercules Loan Agreement, as amended, limits our ability to pay any cash amount upon repurchase of the Notes.

The Hercules Loan Agreement, as amended, prohibits us from making any cash payments to repurchase the Notes upon a fundamental change. Any new credit facility that we may enter into may have similar restrictions.

Our failure to repurchase the Notes as required under the terms of the Notes would constitute a default under the indenture governing the Notes and permit holders of the Notes to accelerate our obligations under the Notes. A default under the indenture or the fundamental change itself could also lead to a default under the Hercules Loan Agreement, as amended, or agreements governing our future indebtedness. If the repayment of the related indebtedness were to be accelerated after any applicable notice or grace periods, we may not have sufficient funds to repay the indebtedness and repurchase the Notes.

Future sales of our common stock or equity-linked securities in the public market could lower the market price for our common stock.

In the future, we may sell additional shares of our common stock or equity-linked securities to raise capital. In addition, a substantial number of shares of our common stock are reserved for issuance upon the exercise of stock options and upon conversion of the Notes. We cannot predict the size of future issuances or the effect, if any, that they may have on the market price for our common stock. The issuance and sale of substantial amounts of common stock or equity-linked securities, or the perception that such issuances and sales may occur, could adversely affect the market price of our common stock and impair our ability to raise capital through the sale of additional equity or equity-linked securities.

Risks Related to Our Common Stock

The trading price of our common stock is volatile.

The trading price of our common stock could be subject to significant fluctuations. Market prices for securities of pharmaceutical, biotechnology and other life sciences companies have historically been particularly volatile. Some of the factors that may cause the trading price of our common stock to fluctuate include:

- the commercial performance of NUZYRA and SEYSARA;
- our ability to maintain and expand regulatory approval for NUZYRA;
- issues in manufacturing NUZYRA;
- the results of our current and any future clinical trials of NUZYRA or our product candidates;
- the entry into, or termination of, key agreements, including key commercial partner agreements;
- the initiation of, material developments in, or conclusion of litigation to enforce or defend any of our intellectual property rights or defend against the intellectual property rights of others;
- announcements by commercial partners or competitors of new commercial products, clinical progress or the lack thereof, significant contracts, commercial relationships or capital commitments;
- adverse publicity relating to the antibiotics market, including with respect to other products and potential products in such market;
- the introduction of technological innovations or new therapies that compete with our products;
- the loss of key employees;
- changes in estimates or recommendations by securities analysts, if any, who cover our common stock;
- general and industry-specific economic conditions that may affect our research and development expenditures;
- changes in the structure of healthcare payment systems; and
- period-to-period fluctuations in our financial results, including, in particular, our use of cash in operations.

Moreover, the stock markets in general have experienced substantial volatility that has often been unrelated to the operating performance of individual companies. These broad market fluctuations may also adversely affect the trading price of our common stock.

In the past, following periods of volatility in the market price of a company's securities, stockholders have often instituted class action securities litigation against those companies. Such litigation, if instituted, could result in substantial costs and diversion of management attention and resources, which could significantly harm our profitability and reputation.

We do not anticipate that we will pay any cash dividends in the foreseeable future.

We expect that we will retain our future earnings to fund the development and growth of our business. As a result, capital appreciation, if any, of our common stock will be your sole source of gain, if any, for the foreseeable future.

Anti-takeover provisions in our charter documents and under Delaware law could make an acquisition of us more difficult and may prevent attempts by our stockholders to replace or remove our management.

Provisions in our certificate of incorporation and bylaws may delay or prevent an acquisition or a change in management. These provisions include a classified board of directors, a prohibition on actions by written consent of our stockholders and the ability of the board of directors to issue preferred stock without stockholder approval. In addition, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporate Law, or DGCL, which prohibits stockholders owning in excess of 15% of our voting stock from merging or combining with us. Although we believe these provisions collectively will provide for an opportunity to receive higher bids by requiring potential acquirers to negotiate with our board of directors, they would apply even if the offer may be considered beneficial by some stockholders. In addition, these provisions may frustrate or prevent any attempts by our stockholders to replace or remove then current management by making it more difficult for stockholders to replace members of the board of directors, which is responsible for appointing the members of management.

Future sales of shares by existing stockholders could cause the trading price of our common stock to decline.

If our existing stockholders sell, or indicate an intention to sell, substantial amounts of our common stock in the public market, the trading price of our common stock could decline. As of December 31, 2018, approximately 3.1 million shares of common stock are held by our directors, executive officers and other affiliates and are subject to volume limitations under Rule 144 under the Securities Act. In addition, approximately 1.1 million shares of common stock that are subject to outstanding options and restricted stock units as of December 31, 2018 will become eligible for sale in the public market to the extent permitted by the provisions of various vesting agreements and Rule 144 under the Securities Act. If these additional shares are sold, or if it is perceived that they will be sold, in the public market, the trading price of our common stock could decline.

Because our merger resulted in an ownership change under Section 382 of the Internal Revenue Code for Transcept, Transcept's pre-merger net operating loss carryforwards and certain other tax attributes are subject to limitations. The net operating loss carryforwards and other tax attributes of the former Paratek entity and us may also be subject to limitations as a result of ownership changes.

If a corporation undergoes an "ownership change" within the meaning of Section 382 of the Internal Revenue Code of 1986, as amended, or Section 382, the corporation's net operating loss carryforwards and certain other tax attributes arising from before the ownership change are subject to limitations on use after the ownership change. In general, an ownership change occurs if there is a cumulative change in the corporation's equity ownership by certain stockholders that exceeds 50 percentage points over a rolling three-year period. Similar rules may apply under state tax laws. The Merger resulted in an ownership change for Transcept and, accordingly, Transcept's net operating loss carryforwards and certain other tax attributes are subject to limitations on their use after the Merger. Old Paratek's net operating loss carryforwards may also be subject to limitation as a result of prior shifts in equity ownership and/or the Merger. Additional ownership changes in the future could result in additional limitations on Transcept's, Old Paratek's and our net operating loss carryforwards. Consequently, even if we achieve profitability, we may not be able to utilize a material portion of Transcept's, Old Paratek's or our net operating loss carryforwards and other tax attributes, which could have a material adverse effect on cash flow and results of operations.

If securities or industry analysts do not publish research or reports or publish inaccurate or unfavorable research about us, the trading price and trading volume of our common stock could decline.

The trading market for our common stock is influenced by the research and reports that securities or industry analysts publish about us, our business and our common stock. As of December 31, 2018, we had research coverage by 13 securities analysts. If the analysts who cover us downgrade our common stock or publish inaccurate or unfavorable research regarding us or our business model, technology or stock performance, the trading price of our common stock would likely decline. If one or more of these analysts ceases coverage of us or fails to publish reports on us regularly, we could lose visibility in the financial markets, which in turn could cause the trading price or trading volume of our common stock to decline. Moreover, the unpredictability of our financial results likely reduces the certainty, and therefore reliability, of the forecasts by securities or industry analysts of our future financial results, adding to the potential volatility of the trading price of our common stock.

Maintaining and improving our financial controls and the requirements of being a public company may strain our resources, divert management's attention and affect our ability to attract and retain qualified board members.

The trading market for our common stock is influenced by the research and reports that securities or industry analysts publish. As a public company, we are subject to the reporting requirements of the Exchange Act, the Sarbanes-Oxley Act of 2002, or the Sarbanes-Oxley Act, and The Nasdaq Global Market rules. The requirements of these rules and regulations have increased and will continue to significantly increase our legal and financial compliance costs, including costs associated with the hiring of additional personnel, making some activities more difficult, time-consuming or costly, and may also place undue strain on our personnel, systems and resources. The Exchange Act requires, among other things, that we file annual, quarterly and current reports with respect to our business and financial condition.

The Sarbanes-Oxley Act requires, among other things, that we maintain disclosure controls and procedures and internal control over financial reporting. Ensuring that we have adequate internal financial and accounting controls and procedures in place, as well as maintaining these controls and procedures, is a costly and time-consuming effort that needs to be re-evaluated frequently. Section 404 of the Sarbanes-Oxley Act, or Section 404, requires that we annually evaluate our internal control over financial reporting to enable management to report on, and our independent auditors to audit as of the end of each fiscal year, the effectiveness of those controls. In connection with the Section 404 requirements, both we and our independent registered public accounting firm test our internal controls and could, as part of that documentation and testing, identify material weaknesses, significant deficiencies or other areas for further attention or improvement.

Implementing any appropriate changes to our internal controls may require specific compliance training for our directors, officers and employees, require the hiring of additional finance, accounting and other personnel, entail substantial costs to modify our existing accounting systems, and take a significant period of time to complete. These changes may not, however, be effective in maintaining the adequacy of our internal controls, and any failure to maintain that adequacy, or consequent inability to produce accurate financial statements on a timely basis, could increase our operating costs and could materially impair our ability to operate our business. Moreover, adequate internal controls are necessary for us to produce reliable financial reports and are important to help prevent fraud. As a result, our failure to satisfy the requirements of Section 404 on a timely basis could result in the loss of investor confidence in the reliability of our financial statements, which in turn could cause the market value of our common stock to decline.

Various rules and regulations applicable to public companies make it more difficult and more expensive for us to maintain directors' and officers' liability insurance, and we may be required to accept reduced coverage or incur substantially higher costs to maintain coverage. If we are unable to maintain adequate directors' and officers' liability insurance, our ability to recruit and retain qualified officers and directors, especially those directors who may be deemed independent for purposes of The Nasdaq Global Market rules, will be significantly curtailed.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

Our headquarters are located in Boston, Massachusetts, where we occupy approximately 12,000 square feet of office space under a lease that expires in 2021. We also rent approximately 19,000 square feet of office space in King of Prussia, Pennsylvania on a monthly basis under a lease that expires in 2024.

Item 3. Legal Proceedings

From time to time the Company is involved in legal proceedings arising in the ordinary course of business. The Company believes there is no litigation pending that could have, individually, or in the aggregate, a material adverse effect on its results of operations or financial condition.

Item 4. Mine Safety Disclosures

None.

PART II

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

Market Information

Our common stock is traded on The Nasdaq Global Market under the symbol "PRTK." As of February 28, 2019, there were 81 holders of record of our common stock.

Recent Sales of Unregistered Securities

Set forth below is information regarding securities sold by us during 2018 that were not registered under the Securities Act. Also included is the consideration, if any, received by us for the securities and information relating to the section of the Securities Act, or rule of the SEC under which exemption from registration was claimed.

On August 1, 2018, we entered into the fifth amendment to the Loan Agreement with Hercules. In connection with the amendment, we issued to Hercules Capital, Inc. a warrant to purchase our common stock, or the Fifth Amendment Warrant. The Fifth Amendment Warrant is exercisable for a minimum of up to 19,627 shares of our common stock (and additional shares if certain additional tranches are funded) at an exercise price of $10.19 per share. The Fifth Amendment Warrant's total relative fair value of $0.1 million was determined using a Black-Scholes option-pricing model, as described in Note 10, *Common Stock*, in the accompanying notes to the consolidated financial statements, and was included as a discount to the Term Loan, as defined in Note 14, *Long-term Debt*. The exercise price and the number of shares are subject to adjustment upon a merger event, reclassification of the shares of common stock, subdivision or combination of the shares of common stock or certain dividends payments. The Fifth Amendment Warrant is exercisable at any time until the earlier of seven years from issuance and the consummation of a Public Acquisition, as defined in the Fifth Warrant agreement, and will be exercised automatically on a net issuance basis if not exercised prior to the termination date and if the then-current fair market value of one share of common stock is greater than the exercise price then in effect.

No underwriters were involved in the foregoing sale of securities. The Fifth Amendment Warrant was issued to Hercules Capital, Inc. in reliance upon the exemption from the registration requirements of the Securities Act, as set forth in Section 4(a)(2), relative to transactions by an issuer not involving any public offering. Hercules Capital, Inc. represented to us in connection with its purchase that it was an "accredited investor" as defined in Rule 501 of Regulation D promulgated under the Securities Act and was acquiring the securities for its own account for investment purposes only and not with a view to, or for sale in connection with, any distribution thereof. Hercules Capital, Inc. received written disclosures that the securities had not been registered under the Securities Act and that any resale must be made pursuant to a registration statement or an available exemption from such registration.

Securities authorized for issuance under equity compensation plans

The following table provides certain information with respect to all of our equity compensation plans in effect as of December 31, 2018:

Plan Category	Number of Securities to be Issued Upon Exercise of Outstanding Options, Warrants and Rights		Weighted-Average Exercise Price of Outstanding Options, Warrants and Rights		Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans(1)	
Equity compensation plans approved by stockholders(1)	4,587,304	(2)	$ 11.23	(3)	1,121,113	(4)
Equity compensation plans not approved by stockholders	764,550	(5)	16.99	(6)	645,450	(7)
Total	5,351,854		$ 12.05		1,766,563	

(1) The number of authorized shares under the 2015 Equity Incentive Plan, or the 2015 Plan, will automatically increase on January 1 of each year, for the period commencing on (and including) January 1, 2016 and ending on (and including) January 1, 2025, in an amount equal to 5% of the total number of shares of common stock outstanding on December 31st of the preceding calendar year. Notwithstanding the foregoing, the Board of Directors of the Company may act prior to January 1st of a given year to provide that there will be no January 1st increase in the Share Reserve for such year or that the increase in the Share Reserve for such year will be a lesser number of shares of common stock than would otherwise occur.

(2) Includes 3,133,012 shares relating to outstanding options, 1,349,837 relating to restricted stock units and 104,455 warrants outstanding.

(3) Represents the weighted-average exercise price of outstanding options, warrants and rights.

(4) Includes 979,833 shares available under the 2009 and 2018 Employee Stock Purchase Plans. All shares cancelled or forfeited during the years ended December 31, 2018 and 2017 under the 2006 and 2014 Plans became available for grant under the 2015 Plan.

(5) Includes 644,150 shares relating to outstanding options and 120,400 relating to restricted stock units under the 2015 Inducement Plan and the 2017 Inducement Plan.

(6) Represents the weighted-average exercise price of outstanding options and rights.

(7) Includes 106,500 shares that remain available for grant under the 2015 Inducement Plan that the Company does not currently anticipate issuing.

Issuer Purchases of Equity Securities

There were no repurchases of our common stock during the fourth quarter of 2018.

Item 6. Selected Financial Data

Prior to October 30, 2014 we were known as Transcept Pharmaceuticals, Inc., or Transcept. On October 30, 2014, Transcept completed a business combination with privately-held Paratek Pharmaceuticals, Inc., or Old Paratek, in accordance with the terms of the Agreement and Plan of Merger and Reorganization, dated as of June 30, 2014, by and among Transcept, Tigris Merger Sub, Inc., or Merger Sub, Tigris Acquisition Sub, LLC, or Merger LLC, and Old Paratek, or the Merger Agreement, pursuant to which Merger Sub merged with and into Old Paratek, with Old Paratek surviving as a wholly-owned subsidiary of Transcept, followed by the merger of Old Paratek with and into Merger LLC, with Merger LLC surviving as a wholly-owned subsidiary of Transcept, these mergers together, the Merger. For accounting purposes, Transcept was deemed to be the acquired entity in the Merger, and the Merger was accounted for as a reverse acquisition. In connection with the Merger, we changed our name to Paratek Pharmaceuticals, Inc. and effected a 1-for-12 reverse stock split of our common stock. Our consolidated financial statements reflect the historical results of Old Paratek prior to the Merger and that of the combined company following the Merger, and do not include the historical results of Transcept Pharmaceuticals, Inc. prior to the completion of the Merger. All share and per share disclosures have been retroactively adjusted to reflect the exchange of shares in the Merger, and the 1-for-12 reverse split of our common stock on October 30, 2014.

The following selected financial data has been derived from our audited consolidated financial statements. The information below is not necessarily indicative of the results of future operations and should be read in conjunction with Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations," and Item 1A, "Risk Factors," of this Annual Report on Form 10-K, and the consolidated financial statements and related notes thereto included in Item 8, "Financial Statements and Supplementary Data", of this Annual Report on Form 10-K, in order to fully understand factors that may affect the comparability of the information presented below. All per share amounts reflect the conversion of Old Paratek common stock to our common stock on October 30, 2014 at the rate of 0.0675 shares of common stock, after giving effect to the 1-for-12 reverse stock split, for each share of Old Paratek common stock outstanding on October 30, 2014.

	Year Ended December 31,				
	2018	2017	2016	2015	2014
			(in thousands, except per share and data)		
Consolidated Statements of Operations Data:					
Revenue	$ 17,117	$ 12,616	$ 29	$ —	$ 4,342
Operating expenses:					
Research and development	57,508	60,072	83,460	50,765	5,014
General and administrative	63,658	36,965	26,400	19,988	5,848
Merger-related costs	—	—	—	—	1,278
Impairment of intangible assets	107	743	—	2,860	—
Change in fair value of contingent consideration	(71)	(584)	(345)	(3,560)	—
Total operating expenses	121,202	97,196	109,515	70,053	12,140
Loss from operations	(104,085)	(84,580)	(109,486)	(70,053)	(7,798)
Other (expense) income, net	(7,769)	(3,736)	(2,150)	(807)	(10,037)
Net loss before provision for income taxes	(111,854)	(88,316)	(111,636)	(70,860)	(17,835)
Provision for income taxes	502	753	—	—	—
Net loss	(112,356)	(89,069)	(111,636)	(70,860)	(17,835)
Unaccreted dividends on convertible preferred stock	—	—	—	—	(1,927)
Net loss attributable to common stockholders	$ (112,356)	$ (89,069)	$ (111,636)	$ (70,860)	$ (19,762)
Net loss per share, basic and diluted	$ (3.57)	$ (3.32)	$ (5.51)	$ (4.29)	$ (7.82)
Weighted average common shares outstanding, basic and diluted	31,513,454	26,827,253	20,253,082	16,501,912	2,528,595

	As of December 31,	
	2018	2017
Selected Consolidated Balance Sheet Data:		
Cash, cash equivalents and marketable securities	$ 292,838	$ 151,723
Total assets	300,192	163,698
Working capital	237,534	143,697
Current liabilities	17,709	16,789
Long-term obligations, less current portion	228,959	59,186
Common stock and additional paid-in capital	630,174	552,748
Accumulated deficit	(582,468)	(470,112)
Total stockholders' equity	47,578	82,478

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

The following Management's Discussion and Analysis of Financial Condition and Results of Operations contains certain statements that are not strictly historical and are "forward-looking" statements within the meaning of the Private Securities Litigation Reform Act of 1995 and involve a high degree of risk and uncertainty. Actual results may differ materially from those projected in the forward-looking statements due to other risks and uncertainties. All forward-looking statements included in this section are based on information available to us as of the date hereof, and we assume no obligation to update any such forward-looking statement, except as required by law.

Company Overview

We are a commercial-stage biopharmaceutical company focused on the development and commercialization of innovative therapeutics. Our product, NUZYRA™ (omadacycline), and SEYSARA™, (sarecycline), with respect to which we have exclusively licensed to Almirall, LLC, or Almirall, development and commercialization rights in the United States, both received U.S. Food and Drug Administration, or FDA, approval in October 2018. The FDA approved NUZYRA, a once-daily oral and intravenous, or IV, broad spectrum antibiotic, for the treatment of adults with community acquired bacterial pneumonia, or CABP, and acute bacterial skin and skin structure infections, or ABSSSI, caused by susceptible bacteria. We launched NUZYRA in the United States in February 2019. The FDA approved SEYSARA, a new once-daily oral therapy, for the treatment of inflammatory acne vulgaris in patients age nine or older. Almirall launched SEYSARA in the United States in January 2019.

To date, we have devoted a substantial amount of our resources to research and development efforts, including conducting clinical trials for omadacycline, protecting our intellectual property and providing general and administrative support for these operations. As of December 31, 2018, we have not generated any revenue from product sales and to date have financed our operations primarily through sale of our common stock, debt financings, strategic collaborations, and grant funding.

We have incurred significant losses since our inception in 1996. Our accumulated deficit at December 31, 2018 was $582.5 million and our net loss for the year ended December 31, 2018 was $112.4 million. A substantial amount of our net losses resulted from costs incurred in connection with our research and development programs and general and administrative costs associated with our operations. The net losses and negative operating cash flows incurred to date, together with expected future losses, have had, and likely will continue to have, an adverse effect on our stockholders' equity and working capital. The amount of future net losses will depend, in part, on the rate of future growth of our expenses and our ability to generate offsetting revenue, if any. We expect to continue to incur significant expenses and operating losses for the foreseeable future.

Until we can generate a sufficient amount of product and royalty revenue, if ever, we anticipate that we will need to raise additional capital in order to complete the development and commercialization of omadacycline and to advance the development of our other product candidates. Until we can generate a sufficient amount of product and royalty revenue to finance our cash requirements, we expect to finance our future cash needs primarily through a combination of public or private equity offerings, debt or other structured financings, strategic collaborations and grant funding. We may be unable to raise capital when needed or on attractive terms, which would force us to delay, limit, reduce or terminate our development programs or commercialization efforts. We will need to generate significant revenue to achieve and sustain profitability, and we may never be able to do so.

Financial Operations Overview

Revenue

As of December 31, 2018, we have not generated any revenue from product sales. All of our revenue to date has been derived from license fees, milestone payments, royalty income, reimbursements for research, development and manufacturing activities under licenses and collaborations, grant payments received from the National Institute of Health, or NIH, and other non-profit organizations. In February 2019, we made NUZYRA commercially available in the United States. Almirall launched SEYSARA in the United States in January 2019.

Collaboration revenue represents upfront fees and milestone payments received in connection with our collaboration agreements. Royalty revenue represents fifty percent of Intermezzo royalty income received pursuant to the royalty sharing agreement, or the Royalty Sharing Agreement, entered into by us in October 2016 with the Special Committee of our Board of Directors. The New Drug Application, or NDA, for Intermezzo was withdrawn from the FDA by Purdue Pharma as of December 31, 2018 and further sales of the drug are not planned. Neither Paratek nor the former shareholders of Transcept will receive future cash payments pursuant to the Royalty Sharing Agreement and no further Intermezzo royalty revenue is expected.

Research and Development Expense

Research and development expenses consisted primarily of costs directly incurred by us for the development of our product candidates, which include:

- expenses incurred under agreements with clinical research organizations, or CROs, and investigative sites that conduct our clinical trials;
- the cost of acquiring and manufacturing preclinical and clinical study materials and developing manufacturing processes;
- direct employee-related expenses, including salaries, benefits, travel and stock-based compensation expense of our research and development personnel;
- allocated facilities, depreciation, and other expenses, which include rent and maintenance of facilities, insurance and other supplies; and
- costs associated with preclinical activities and regulatory compliance.

Research and development costs are expensed as incurred. Costs for certain development activities are recognized based on an evaluation of the progress to completion of specific tasks using information and data provided to us by our vendors and our clinical sites.

We cannot determine with certainty the duration and completion costs of the current or future clinical trials of our product candidates or if, when, or to what extent we will generate revenues from the commercialization and sale of any of our product candidates for which we or any partner obtain regulatory approval. Aside from the FDA approval of NUZYRA and SEYSARA in the United States, we or our partners may never succeed in achieving regulatory approval for any of our other product candidates. The duration, costs and timing of clinical trials and development of our product candidates will depend on a variety of factors, including:

- the scope, rate of progress, and expense of our ongoing, as well as any additional, clinical trials and other research and development activities;
- future clinical trial results;
- potential changes in government regulation; and
- the timing and receipt of any regulatory approvals.

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 therapeutic candidate. For example, if the FDA, or another regulatory authority, were to require us to conduct clinical trials beyond those that we currently anticipate will be required for the completion of the clinical development of product candidates, or if we experience significant delays in the enrollment in any clinical trials, we could be required to expend significant additional financial resources and time on the completion of clinical development.

We manage certain activities, such as clinical trial operations, manufacture of clinical trial material, and preclinical animal toxicology studies, through third-party contract organizations. The only costs we track by each product candidate are external costs such as services provided to us by CROs, manufacturing of preclinical and clinical drug product, and other outsourced research and development expenses. We do not assign or allocate to individual development programs internal costs such as salaries and benefits, facilities costs, lab supplies and the costs of preclinical research and studies. Our research and development expenses for omadacycline and other projects during 2018 and 2017 are as follows:

	Year Ended December 31,	
(in thousands)	**2018**	**2017**
Omadacycline	$ 32,316	$ 41,786
Other research and development costs	25,192	18,286
Total	$ 57,508	$ 60,072

General and Administrative Expense

General and administrative expense consists primarily of salaries and other related costs for personnel and professional, legal and consulting fees.

Interest Expense

Interest expense represents interest incurred on the Hercules Loan Agreement (as defined below), as amended, and the Notes (as defined below), as well as the adjustment of our marketable securities to amortized cost.

Interest Income

Interest income represents interest earned on our money market funds and marketable securities.

Results of Operations

Comparison of the Years Ended December 31, 2018 and 2017

	Year Ended December 31,	
	2018	2017
Revenue		
Collaboration and royalty revenue	$ 17,117	$ 12,616
Total revenue	17,117	12,616
Operating expenses:		
Research and development	57,508	60,072
General and administrative	63,658	36,965
Impairment of intangible assets	107	743
Changes in fair value of contingent consideration	(71)	(584)
Total operating expenses	121,202	97,196
Loss from operations	(104,085)	(84,580)
Other income and expenses:		
Interest income	3,260	1,377
Interest expense	(10,985)	(5,079)
Other losses	(44)	(34)
Net loss before provision for income taxes	(111,854)	(88,316)
Provision for income taxes	502	753
Net loss	$ (112,356)	$ (89,069)

Revenue

Revenue for the year ended December 31, 2018 consists of a $12.0 million milestone payment earned under the Almirall Collaboration Agreement (as defined below), a $5.0 million milestone payment earned under the License and Collaboration Agreement, or the Zai Collaboration Agreement, between Paratek Bermuda Ltd., a wholly-owned subsidiary of Paratek Pharmaceuticals, Inc., and Zai Lab (Shanghai) Co. Ltd., or Zai, and $0.1 million of revenue earned under the Royalty Sharing Agreement. The Zai and Almirall milestone payments were earned upon FDA approval of NUZYRA and SEYSARA, respectively, in October 2018. Revenue for the year ended December 31, 2017 consists of a $7.5 million upfront payment received as part of the Zai Collaboration Agreement, a $5.0 million milestone payment earned from Allergan upon the FDA's acceptance of the sarecycline (SEYSARA) NDA, and $0.1 million of revenue earned under the Royalty Sharing Agreement.

Research and Development Expense

Research and development expenses were $57.5 million for the year ended December 31, 2018, compared to $60.1 million for the year ended December 31, 2017. The slight decrease was driven primarily by lower clinical study costs, offset by higher compensation-related costs, including stock-based compensation expense due to the vesting of several performance-based restricted stock unit, or PRSU, awards, manufacturing production costs for omadacycline, and costs associated with additional regulatory activities. We anticipate that research and development expenses will increase in future periods in connection with FDA post-marketing commitments as well as our Phase 2 UTI program. This will be offset by the capitalization of NUZYRA commercial supply costs, which were classified as research and development expense until FDA approval of NUZYRA on October 2, 2018.

General and Administrative Expense

General and administrative expenses were $63.7 million for the year ended December 31, 2018, compared to $37.0 million for the year ended December 31, 2017. The increase was primarily due to higher compensation-related costs associated with additional headcount and stock-based compensation expense due to the vesting of several PRSU awards as well as increased spend related to the U.S. launch of NUZYRA. We anticipate that our general and administrative expenses will increase in future periods associated with the commercial launch of NUZYRA, which occurred in February 2019.

Impairment of Intangible Assets

During 2018, we recorded a $0.1 million impairment charge in connection with an expected decline in Intermezzo sales and the withdrawal of the NDA for Intermezzo from the FDA by Purdue Pharma as of December 31, 2018. As a result of this withdrawal, further sales of the drug are not planned and neither Paratek nor the former shareholders of Transcept will receive future cash payments pursuant to the Royalty Sharing Agreement. As such, we impaired the remaining balance of the Intermezzo product rights during 2018. During the year ended December 31, 2017, we recorded an impairment charge of $0.7 million in connection with an expected decline in Intermezzo sales.

Changes in Fair Value of Contingent Obligations

During the years ended December 31, 2018 and 2017, we recorded a $0.1 million decrease and $0.6 million decrease, respectively, in the fair value of our contingent obligation to former Transcept shareholders. The decrease in the fair value of our contingent obligation is the result of Purdue no longer selling Intermezzo, as described in the "*Impairment of Intangible Assets*" section above.

Other Income and Expenses

Interest expense for the year ended December 31, 2018 represents interest incurred on the Hercules Loan Agreement, as amended, of $6.7 million and the Notes of $6.0 million, partially offset by the net accretion of our marketable securities of $1.7 million. Interest income for the year ended December 31, 2018 represents interest earned on our money market funds and marketable securities of $3.3 million. Interest expense for the year ended December 31, 2017 represents interest incurred on the Hercules Loan Agreement, as amended, of $4.9 million and the net amortization of our marketable securities of $0.2 million. Interest income for the year ended December 31, 2017 represents interest earned on our money market funds and marketable securities of $1.4 million.

Liquidity and Capital Resources

On September 30, 2015, we entered into a Loan and Security Agreement, or the Hercules Loan Agreement, with Hercules Technology II, L.P. and Hercules Technology III, L.P, together, Hercules, and certain other lenders and Hercules Technology Growth Capital, Inc. (as agent). We executed five amendments to the Hercules Loan Agreement subsequent to September 30, 2015. On August 1, 2018, we entered into the Fifth Amendment to the Hercules Loan Agreement. The Fifth Amendment increased the amount that we may borrow by $30.0 million, from up to $60.0 million to up to $90.0 million, in multiple tranches. Prior to the Fifth Amendment, we borrowed the full $60.0 million that was available to us. Concurrently with the closing of the Fifth Amendment, we borrowed the Fifth Tranche of $10.0 million. Two additional tranches of up to $10.0 million each ($20.0 million total), or the Additional Tranches, may be available to us, subject to determination by Hercules, in its sole discretion, whether to provide such tranches. As such there can be no assurance as to whether or not the Additional Tranches shall be funded. The Fifth Amendment extended the date on which we are required to begin making monthly principal installments on loans previously outstanding under the Hercules Loan Agreement, or the Prior Tranches, from January 1, 2019 to January 1, 2021, subject to our receipt of marketing approval for omadacycline, or the Interest Only Period Extension Event, which was obtained on October 2, 2018. Beginning on January 1, 2021, we are obligated to make payments in equal monthly installments of principal and interest with respect to the Prior Tranches. The Prior Tranches mature on September 1, 2021, due to the achievement of the Interest Only Period Extension Event. With respect to the $10.0 million loan made to the Company upon the execution of the Fifth Amendment, we are obligated to make payments in equal monthly installments of principal and interest beginning on September 1, 2020 (subject to extension to March 1, 2021 or September 1, 2021) upon achievement of specified levels of omadacycline revenue, and such loan matures on August 1, 2022

To date, we have issued to each of Hercules Technology II, L.P. and Hercules Technology III, L.P., a warrant to purchase 16,346 shares of our common stock (32,692 shares of common stock in total) at an exercise price of $24.47 per share and a warrant to purchase 18,574 shares of our common stock (37,148 shares of common stock in total) at an exercise price of $13.46 per share. We also have issued a warrant to Hercules Capital, Inc. that is exercisable for an aggregate of 5,374 shares of our common stock at an exercise price of $23.26 per share. In connection with the Fifth Amendment, on August 1, 2018, we issued to Hercules Capital, Inc. a warrant to purchase up to 19,627 shares of its common stock at an exercise price of $10.19 per share.

In October 2015 and February 2017, we entered into the Controlled Equity Offering℠ Sales Agreements, or the 2015 Sales Agreement and 2017 Sales Agreement, respectively, and collectively, the Sales Agreements, with Cantor Fitzgerald & Co., or Cantor, under which we could, at our discretion, from time to time sell shares of our common stock, with a sales value of up to $50.0 million under each Sales Agreement through Cantor. We provided Cantor with customary indemnification rights, and Cantor was entitled to a commission at a fixed rate of 3% of the gross proceeds per share sold. Sales of the shares of our common stock under the Sales Agreements were to be made in transactions deemed to be "at the market offerings", as defined in Rule 415 under the Securities Act. We have sold all $50.0 million of shares of our common stock under the 2015 Sales Agreement. We received $1.7 million in proceeds, after deducting commissions of $0.1 million, from the sale of 96,308 shares of common stock, during the year ended December 31, 2018, under the 2017 Sales Agreement. As of February 28, 2019, $0.8 million remains available for sale under the 2017 Sales Agreement.

On October 16, 2015, we filed a registration statement on Form S-3 with the SEC, which was declared effective on October 29, 2015, to sell certain of our securities in an aggregate amount of up to $100.0 million. Under this shelf registration statement, we completed an underwritten offering on January 22, 2018 of 3,205,128 shares of our common stock, resulting in total proceeds of $50.0 million. Offering expenses incurred were $0.2 million. The remaining $50.0 million available under this shelf registration statement was not used and this registration statement expired in October 2018.

On December 12, 2016, we filed a registration statement on Form S-3 with the SEC, which was declared effective on December 20, 2016, to sell certain of our securities in an aggregate amount of up to $225.0 million. As of December 31, 2018, $175.0 million remains available on this shelf registration statement.

Additionally, on December 1, 2017, we filed a registration statement on Form S-3 with the SEC, which was declared effective on December 8, 2017, to sell certain of our securities in an aggregate amount of up to $250.0 million. As of December 31, 2018, $250.0 million remains available on this shelf registration statement.

On April 18, 2018, we entered into a Purchase Agreement, or the Purchase Agreement, with several initial purchasers, or the Initial Purchasers, for whom Merrill Lynch, Pierce, Fenner & Smith Incorporated and Leerink Partners LLC acted as representatives, relating to the sale of $135.0 million aggregate principal amount of 4.75% Convertible Senior Subordinated Notes due 2024, or the Notes. We also granted the Initial Purchasers an option to purchase up to an additional $25.0 million aggregate principal amount of Notes, which was exercised in full on April 20, 2018. In addition, J. Wood Capital Advisors LLC, the Company's financial advisor, purchased $5.0 million aggregate principal amount of Notes in a separate, concurrent private placement on the same terms as other investors. After deducting costs incurred of $6.0 million, we received proceeds from the sale of the Notes of $159.0 million in April 2018.

On February 25, 2019, we, through our wholly-owned subsidiary Paratek Royalty Corporation, or the Subsidiary, entered into a royalty-backed loan agreement, or the Royalty-Backed Loan Agreement, with Healthcare Royalty Partners III, L.P., or the Lender. Pursuant to the terms of the Royalty-Backed Loan Agreement, upon the satisfaction of the condition's precedent set forth therein, the Subsidiary expects to borrow a $32.5 million loan, which will be secured by, and repaid based upon, royalties from the Almirall Collaboration Agreement.

Under the Royalty-Backed Loan Agreement, the outstanding principal balance will bear interest at an annual rate of 12.0%. Payments of interest under the Royalty-Backed Loan Agreement will be made quarterly, beginning in August 2019, out of the Almirall Collaboration Agreement. Royalty payments received since the immediately preceding payment date. On each interest payment date, any royalty payments in excess of accrued interest on the loan will be used to repay the principal of the loan until the balance is fully repaid. In addition, the Subsidiary will make up-front payments to the Lender of (i) a 1.5% fee and (ii) up to $300,000 for the Lender's expenses. The Royalty-Backed Loan Agreement matures on May 1, 2029, at which time, if not earlier repaid in full, the outstanding principal amount of the loan, together with any accrued and unpaid interest, and all other obligations then outstanding, shall be due and payable in cash. We have entered into a Pledge and Security Agreement in favor of the Lender, pursuant to which the Subsidiary's obligations under the Loan Agreement are secured by a pledge of all of our holdings of the Subsidiary's capital stock.

The Royalty-Backed Loan Agreement contains certain customary affirmative covenants, including those relating to: use of proceeds; maintenance of books and records; financial reporting and notification; compliance with laws; and protection of our intellectual property. The Royalty-Backed Loan Agreement also contains certain customary negative covenants, barring the Subsidiary from: certain fundamental transactions; issuing dividends and distributions; incurring additional indebtedness outside of the ordinary course of business; engaging in any business activity other than related to the Almirall Collaboration Agreement; and permitting any additional liens on the collateral provided to Lender under the Royalty-Backed Loan Agreement.

The Royalty-Backed Loan Agreement contains customary defined events of default, upon which any outstanding principal and unpaid interest shall be immediately due and payable. These include: failure to pay any principal or interest when due; any uncured breach of a representation, warranty or covenant; any uncured failure to perform or observe covenants; any uncured cross default under a material contract; any uncured breach of our representations, warranties or covenants under its Contribution and Servicing Agreement with the Subsidiary; any termination of the Almirall Collaboration Agreement; and certain bankruptcy or insolvency events.

We have used and we intend to continue to use the net proceeds from the above offerings of our common stock and the Notes, as well as from the Hercules Loan Agreement, as amended, and the Royalty-Backed Loan Agreement, together with our existing capital resources, to fund our ongoing company operations, including clinical studies of omadacycline, NUZYRA commercial operations, working capital, and other general corporate purposes.

As of December 31, 2018, we had cash, cash equivalents and marketable securities of $292.8 million.

The following table summarizes our cash provided by and (used in) operating, investing and financing activities (in thousands):

	Year Ended December 31,	
	2018	2017
Net cash used in operating activities	$ (81,179)	$ (78,574)
Net cash used in investing activities	(127,874)	(42,657)
Net cash provided by financing activities	220,727	103,030

Cash used in operating activities for the year ended December 31, 2018 of $81.2 million is primarily the result of our $112.4 million net loss. This is offset by $27.3 million in non-cash items, including, $25.5 million in stock-based compensation expense primarily due to the vesting of several PRSU awards, $2.8 million of non-cash interest expense related to the Hercules Loan Agreement, as amended, the Notes, and $1.1 million in net depreciation, amortization and accretion, as well as a $5.0 million decrease in accounts receivable.

Cash used in operating activities for the year ended December 31, 2017 of $78.6 million is primarily the result of our $89.1 million net loss, $4.2 million increase in accounts payable and accrued expenses due to completion of our Phase 3 IV-to-oral CABP study and end of enrollment in our Phase 3 oral-only study in ABSSSI and a $4.8 million decrease in prepaid expenses mainly associated with the clinical development of omadacycline. This is offset partially by a $0.8 million decrease in other liabilities and other assets due to the cancellation of a VAT letter of credit during 2017. The remainder represents the net impact of $18.7 million in non-cash items, including $18.2 million in depreciation, amortization, accretion and stock-based compensation expense, $0.4 million in non-cash interest expense, a $0.7 million impairment charge and a decrease in fair value of contingent consideration of $0.6 million.

Investing Activities

Net cash used in investing activities during the year ended December 31, 2018 of $127.9 million consists of $292.9 million investments in marketable securities (U.S. treasury and government agency securities) offset by proceeds from maturities of marketable securities of $165.0 million.

Cash used in investing activities for the year ended December 31, 2017 is primarily the result of purchasing $180.3 million of short-term marketable securities (U.S. treasury and government agency securities) and $1.1 million of fixed asset purchases, offset by proceeds by sales and maturities of marketable securities of $138.7 million.

Financing Activities

Net cash provided by financing activities for 2018 is primarily composed of the following:

- $159.0 million in net proceeds raised through the sale of the Notes;
- $49.8 million in net proceeds raised through the January 2018 offering of common stock;
- $10.0 million in net proceeds received from the Fifth Tranche of the Hercules Loan Agreement, as amended; and
- $1.7 million in net proceeds raised through the sale of shares of our common stock.

Net cash provided by financing activities for 2017 is primarily composed of the following:

- $82.8 million in net proceeds from the sale of common stock under the Sales Agreements;
- $19.9 million, net of issuance costs, on the Hercules Loan Agreement, as amended; and
- $0.3 million in proceeds from the exercise of stock options.

Future Funding Requirements

As of December 31, 2018, we have not generated any revenue from product sales. We launched NUZYRA in the United States in February 2019. Almirall launched SEYSARA in the U.S. in January 2019. Our future funding requirements will depend on our ability to generate revenue from sales of NUZYRA, and our partner, Almirall's, ability to generate revenues from sales of SEYSARA, with respect to which we would be entitled to tiered royalties. We do not expect to generate any other revenue unless and until our partner, Zai, obtains regulatory approval of and commercializes one or more of our product candidates in the Zai territory. We anticipate that we will need substantial additional funding in connection with our continuing operations to support continued development and commercial activities associated with NUZYRA.

We expect to continue to incur significant expenditures and increasing operating losses for the foreseeable future. We anticipate that our expenses will increase substantially as we:

- conduct additional clinical trials of omadacycline;
- seek regulatory approvals for additional indications for omadacycline, such as omadacycline for the treatment of UTI;
- establish a sales, marketing and distribution infrastructure and increases to our manufacturing demand and capabilities to commercialize NUZYRA;
- add personnel to support our commercialization efforts;
- build product inventory; and
- service and pay down our debt.

Based upon our current operating plan, we anticipate that our existing cash, cash equivalents and marketable securities of $292.8 million as of December 31, 2018, estimated NUZYRA product sales, and Royalty-Backed Loan Agreement will fund our operating expenses, capital expenditures, and debt service beyond the first quarter of 2021.

We have based this estimate on assumptions that may prove to be wrong, and we could use our available capital resources sooner than we currently expect. Because of the numerous risks and uncertainties associated with the development and commercialization of our pharmaceutical products, and the unknown extent to which we will maintain existing or enter into new collaborations with third parties to participate in the development and commercialization of our product and product candidates, we are unable to estimate with certainty the amounts of increased capital outlays and operating expenditures that we will require to fund our continuing operations, including for our clinical development programs and commercialization efforts for NUZYRA. Our future capital requirements will depend on many factors, including:

- the progress of clinical development of omadacycline in additional indications, including for the treatment of UTI;
- the costs and timing of commercialization activities for NUZYRA;
- product revenue received from commercial sales of NUZYRA;
- royalty revenue received from commercial sales of SEYSARA by Almirall;
- the ability of Zai to develop, manufacture and commercialize omadacycline in the Zai territory;
- the number and characteristics of other product candidates that we may pursue;
- the scope, progress, timing, cost and results of research, preclinical development and clinical trials;
- the costs, timing and outcome of seeking, obtaining, maintaining and expanding FDA and non-U.S. regulatory approvals;
- the costs associated with manufacturing and establishing sales, marketing and distribution capabilities;
- our ability to maintain, expand and defend the scope of our intellectual property portfolio, including the amount and timing of any payments we may be required to make in connection with the licensing, filing, defense and enforcement of any patents or other intellectual property rights;

- our need and ability to hire additional management, scientific and medical personnel;
- the effect of competing products that may limit market penetration of our products;
- our need to implement additional internal systems and infrastructure, including financial and reporting systems; and
- the economic and other terms, timing and success of our existing collaboration and licensing arrangements and any collaboration, licensing or other arrangements into which we may enter in the future, including the timing of receipt of any milestone or royalty payments under such arrangements.

Until we can generate a sufficient amount of product and royalty revenue to finance our cash requirements, if ever, we expect to finance our future cash needs primarily through a combination of public or private equity offerings, debt or other structured financings, strategic collaborations and grant funding. We do not have any committed external sources of funds other than rights to contingent milestone payments and/or royalties under the Almirall Collaboration Agreement and the Zai Collaboration Agreement, which are terminable by Almirall and Zai, respectively, upon prior written notice. To the extent that we raise additional capital through the sale of equity or convertible debt securities, the ownership interest of our stockholders will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect stockholders' rights. Future debt financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends. If we raise additional funds through marketing and distribution arrangements or other collaborations, strategic alliances or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, NUZYRA, sarecycline, future revenue streams, research programs or product candidates or grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds through equity or debt financings when needed, we may be required to delay, limit, reduce or terminate our product development or commercialization efforts or grant rights to develop and market NUZYRA, sarecycline or our other product candidates that we may otherwise prefer to develop and market ourselves.

Off-Balance Sheet Arrangements

As of December 31, 2018, we do not have any off-balance sheet arrangements.

Critical Accounting Policies and Significant Judgments and Estimates

Our management's discussion and analysis of our financial condition and results of operations are based on our financial statements, which have been prepared in accordance with generally accepted accounting principles of the United States of America. The preparation of these financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, and expenses and the disclosure of contingent assets and liabilities in our financial statements. On an ongoing basis, we evaluate our estimates and judgments, including those related to, among other items, intangible assets, inventory, goodwill, contingent liabilities, stock-based compensation arrangements, clinical accruals, useful lives for depreciation and amortization of long-lived assets and valuation allowances on deferred tax assets. Actual results could differ from those estimates. We base our estimates on historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Our actual results may differ from these estimates under different assumptions or conditions.

While our significant accounting policies are more fully described in Note 2, *Summary of Significant Accounting Policies*, to the consolidated financial statements included in Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K, we believe that the following accounting policies are the most critical to assist stockholders and investors reading the consolidated financial statements in fully understanding and evaluating our financial condition and results of operations.

Revenue Recognition

Effective January 1, 2018, we adopted Accounting Standards Codification, or ASC, Topic 606, *Revenue from Contracts with Customers*, or ASC 606, using the full retrospective transition method. Under this method, we revised our consolidated financial statements for the years ended December 31, 2017 and applicable interim periods within those years, as if ASC 606 had been effective for those periods. This standard applies to all contracts with customers, except for contracts that are within the scope of other standards, such as leases, insurance, and financial instruments. Under ASC 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration that the entity expects to receive in exchange for those goods or services. To determine revenue recognition for arrangements that an entity determines are within the scope of ASC 606, the entity performs the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the entity satisfies a performance obligation. We only apply the

five-step model to contracts when it is probable that the entity will collect the consideration it is entitled to in exchange for the goods or services it transfers to the customer. At contract inception, once the contract is determined to be within the scope of ASC 606, we assess the goods or services promised within each contract and determines those that are performance obligations and assesses whether each promised good or service is distinct. We then recognize as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied as services are rendered.

We enter into collaboration agreements for research, development, manufacturing and commercial services that are within the scope of ASC 606, under which it licenses certain rights to its product candidates to third parties. The terms of these arrangements typically include payment to us of one or more of the following: non-refundable, upfront license fees; reimbursement of certain costs; customer option exercise fees; development, regulatory and commercial milestone payments; and royalties on net sales of licensed products. The amount of variable consideration is constrained until it is probable that the revenue is not at a significant risk of reversal in a future period. The contracts into which we enter generally do not include significant financing components.

As part of the accounting for these arrangements, we must use significant judgment to determine: (a) the transaction price under step (iii) above and (b) the timing of revenue recognition, including the appropriate measure of progress, in step (v) above. We use judgment to determine whether milestones or other variable consideration, except for royalties, should be included in the transaction price, as described further below. The transaction price is allocated to each performance obligation on a relative stand-alone selling price basis, for which we recognize revenue as or when the performance obligations under the contract are satisfied. If a milestone or other variable consideration relates specifically to our efforts to satisfy a single performance obligation or to a specific outcome from satisfying the performance obligation, we generally allocate the milestone amount entirely to that performance obligation once it is probable that a significant revenue reversal would not occur.

Amounts received prior to revenue recognition are recorded as deferred revenue. Amounts expected to be recognized as revenue within the 12 months following the balance sheet date are classified as current portion of deferred revenue in the accompanying consolidated balance sheets. Amounts not expected to be recognized as revenue within the 12 months following the balance sheet date are classified as deferred revenue, net of current portion.

Licenses of intellectual property

In assessing whether a license is distinct from the other promises, we consider factors such as the research, development, manufacturing and commercialization capabilities of the collaboration partner and the availability of the associated expertise in the general marketplace. In addition, we consider whether the collaboration partner can benefit from a license for its intended purpose without the receipt of the remaining promise(s), whether the value of the license is dependent on the unsatisfied promise(s), whether there are other vendors that could provide the remaining promise(s), and whether it is separately identifiable from the remaining promise(s). For licenses that are combined with other promises, we utilize judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing revenue. We evaluate the measure of progress each reporting period and, if necessary, adjusts the measure of performance and related revenue recognition.

Customer options

If an arrangement is determined to contain customer options that allow the customer to acquire additional goods or services, the goods and services underlying the customer options are not considered to be performance obligations at the outset of the arrangement, as they are contingent upon option exercise. We evaluate the customer options for material rights, or options to acquire additional goods or services for free or at a discount. If the customer options are determined to represent or include a material right, the material right is recognized as a separate performance obligation at the outset of the arrangement. We allocate the transaction price to material rights based on the relative standalone selling price, which is determined based on the identified discount and the probability that the customer will exercise. Amounts allocated to a material right are not recognized as revenue until, at the earliest, the option is exercised.

Milestone payments

At the inception of each arrangement that includes milestone payments, we evaluate whether the milestones are considered probable of being achieved and estimates the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant reversal of cumulative revenue would not occur, the associated milestone value is included in the transaction price. Milestone payments that are not within the control of us or the licensee, such as regulatory approvals, are not considered probable of being achieved until those approvals are received. We evaluate factors such as the scientific, clinical, regulatory, commercial, and other risks that must be overcome to achieve the particular milestone in making this assessment. There is considerable judgment involved in determining whether it is probable that a significant reversal of cumulative revenue would not occur. At the end of each subsequent reporting period, we reevaluate the probability of achievement of all milestones subject to constraint and, if necessary, adjusts its estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect revenues and earnings in the period of adjustment.

Royalties

For arrangements that include sales-based royalties, including milestone payments based on a level of sales, and the license is deemed to be the predominant item to which the royalties relate, we recognize revenue at the later of (i) when the related sales occur, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied (or partially satisfied).

Contract costs

We recognize as an asset the incremental costs of obtaining a contract with a customer if the costs are expected to be recovered. As a practical expedient, we recognize the incremental costs of obtaining a contract as an expense when incurred if the amortization period of the asset that we otherwise would have recognized is one year or less. To date, we have not incurred any incremental costs of obtaining a contract with a customer.

Impact of adoption

The adoption of ASC 606 on January 1, 2018 did not result in significant changes to the revenue recognition pattern for any of our license and collaboration agreements. For further discussion of the adoption of this standard, and for a discussion of accounting for collaboration revenue, see Note 4, *License and Collaboration Agreements*.

Marketable Securities

We consider all highly liquid investments purchased with original maturities of 90 days or less at acquisition to be cash equivalents. Cash and cash equivalents include cash held in banks and amounts held primarily in interest-bearing money market accounts. Cash equivalents are carried at cost, which approximates their fair market value.

We determine the appropriate classification of marketable securities at the time of purchase and reevaluate such designation at each balance sheet date. We classified all of our marketable securities at December 31, 2018 as "available-for-sale" pursuant to ASC 320, *Investments – Debt and Equity Securities*. Investments not classified as cash equivalents are presented as either short-term or long-term investments based on both their maturities as well as the time period we intend to hold such securities. Available-for-sale securities are maintained by an investment manager and consist of U.S. treasury and government agency securities. Available-for-sale securities are carried at fair value with the unrealized gains and losses included in other comprehensive income (loss) as a component of stockholders' equity until realized. Any premium or discount arising at purchase is amortized or accreted to interest expense or income over the life of the instrument. Realized gains and losses are determined using the specific identification method and are included in other income or expense. There were no material realized gains or losses on marketable securities recognized for the years ended December 31, 2018 and 2017.

We review marketable securities for other-than-temporary impairment whenever the fair value of a marketable security is less than the amortized cost and evidence indicates that a marketable security's carrying amount is not recoverable within a reasonable period of time. Other-than-temporary impairments of investments are recognized in the consolidated statements of operations and comprehensive loss if we have experienced a credit loss, has the intent to sell the marketable security, or if it is more likely than not that we will be required to sell the marketable security before recovery of the amortized cost basis. Evidence considered in this assessment includes reasons for the impairment, compliance with our investment policy, the severity and duration of the impairment and changes in value subsequent to the end of the period. There were no other-than-temporary impairments of investments recognized for the years ended December 31, 2018 and 2017.

Inventory

Inventories are stated at the lower of cost or estimated net realizable value, on a first-in, first-out basis. Prior to the regulatory approval of our product candidates, we incurred expenses for the manufacture of drug product that could potentially be available to support the commercial launch of our products. Until the first reporting period when regulatory approval has been received or is otherwise considered probable, we record all such costs as research and development expense. Inventory used in clinical trials is also expensed as research and development expense, when selected for such use. We perform an assessment of the recoverability of capitalized inventory during each reporting period and writes down any excess and obsolete inventory to its net realizable value in the period in which the impairment is first identified. Such impairment charges, should they occur, are recorded as a component of cost of product sales in the consolidated statements of operations and comprehensive loss. The determination of whether inventory costs will be realizable requires the use of estimates by management. If actual market conditions are less favorable than projected by management, additional write-downs of inventory may be required.

Accrued Expenses

As part of the process of preparing our consolidated financial statements, we are required to estimate our accrued expenses. This process involves reviewing open contracts and purchase orders, communicating with our personnel to identify services that have been performed for us and estimating the level of service performed and the associated cost incurred for the service when we have not yet been invoiced or otherwise notified of the actual cost. The majority of our service providers invoice us periodically in arrears for services performed or when contractual milestones are met. We make estimates of our accrued expenses as of each balance sheet date in our consolidated financial statements based on facts and circumstances known to us at that time. We periodically confirm the accuracy of our estimates with the service providers and make adjustments if necessary. Examples of estimated expenses include fees paid to:

- CROs, in connection with clinical trials;
- contract manufacturing organizations with respect to clinical material supply;
- vendors in connection with preclinical development and operational activities; and
- legal and other professional service providers.

We base our expenses on our estimates of the services received and efforts expended pursuant to contractual arrangements with CROs, professional service firms and other vendors. The financial terms of these agreements are subject to negotiation, vary from contract to contract and may result in uneven payment flows. There may be instances in which payments made to our vendors will exceed the level of services provided and result in a prepayment of expense. In accruing service fees, we estimate the time period over which services will be performed and the level of effort to be expended in each period. If the actual timing of the performance of services or the level of effort varies from our estimate, we adjust the accrual or prepaid accordingly. Although we do not expect our estimates to be materially different from amounts actually incurred, if our estimates of the status and timing of services performed differs from the actual status and timing of services performed, we may report amounts that are too high or too low in any particular period. To date, there have been no material differences from our estimates to the amount actually incurred.

Research and Development Expenses

We charge costs of our research and development to expense as incurred. Research and development expenses consist of the costs incurred in performing research and development activities, including personnel-related costs, stock-based compensation, facilities, research-related overhead, clinical trial costs, contracted services, manufacturing, license fees and other external costs. We account for nonrefundable advance payments for goods and services that will be used in future research and development activities as expenses when the service has been performed or when the goods have been received rather than when the payment is made.

Stock-Based Compensation

We account for our stock-based awards in accordance with ASC 718, *Compensation—Stock Compensation*, or ASC 718, which requires all stock-based payments to employees, including grants of employee stock options, modifications to existing stock options, and restricted stock unit awards, to be recognized as expense based on their fair values. We recognize the compensation cost of awards subject to performance-based vesting conditions over the requisite service period, to the extent achievement of the performance condition is deemed probable relative to targeted performance. If achievement of the performance condition is not probable, but the award will vest based on the service condition, we recognize the expense over the requisite service period. We account for stock-based awards to non-employees using the fair value method on a straight-line basis over the associated service period of the award in accordance with FASB ASC Topic 505-50, *Equity-Based Payments to Non-Employees*.

We estimate the fair value of our stock-based awards to employees and non-employees using the Black-Scholes option pricing model, which requires the input of highly subjective assumptions, including (1) the expected volatility of our stock, (2) the expected term of the award, (3) the risk-free interest rate and (4) expected dividends. Due to the lack of a public market for our common stock prior to the completion of the Merger on October 30, 2014, and resulting lack of company-specific historical and implied volatility data, we have based our estimate of expected volatility on the historical volatility of a group of similar companies that are publicly traded. For these analyses, we have selected companies with characteristics that we believe are comparable to ours, including enterprise value, risk profiles, position within the industry, and with historical share price information sufficient to meet the expected life of the stock-based awards. We compute the historical volatility data using the daily closing prices for the selected companies' shares during the equivalent period as the calculated expected term of our stock-based awards. During 2015, we began to blend our stock price history, for the length of time we have market data for our stock, with the historical volatility of the group of similar public companies for the expected term of each grant to estimate volatility. We have estimated the expected life of our employee stock options as the average of the midpoints between vesting exercise date for each vesting-trance and the contractual term of the options as the last available exercise date of the option. The risk-free interest rates for periods within the expected life of the option are based on the U.S. Treasury yield curve in effect during the period the options were granted. The Company recognizes the effect of forfeitures in compensation cost when they occur.

Recent Accounting Standards

From time to time, new accounting pronouncements are issued by the FASB or other standard setting bodies and adopted by us as of the specified effective date. Unless otherwise discussed, we believe that the impact of recently issued standards that are not yet effective will not have a material impact on our financial position or results of operations upon adoption.

In November 2018, the FASB issued ASU No. 2018-18, *Collaborative Arrangements (Topic 808): Clarifying the Interaction between Topic 808 and Topic 606,* which clarifies that certain transactions between participants in a collaborative arrangement should be accounted for under ASC 606 when the counterparty is a customer. In addition, ASU 2018-18 precludes an entity from presenting consideration from a transaction in a collaborative arrangement as revenue from contracts with customers if the counterparty is not a customer for that transaction. The Company adopted ASU 2018-18 during the three months ended December 31, 2018. The adoption of ASU 2018-18 did not have a material impact on the Company's financial position or results of operations.

In February 2016, the FASB issued ASU No. 2016-02, Leases (Topic 842). The amendment requires a lessee to recognize assets and liabilities for leases with a maximum possible term of more than 12 months. A lessee would recognize a liability to make lease payments (the lease liability) and a right-of-use asset representing its right to use the leased asset (the underlying asset) for the lease term. This ASU is effective for fiscal years and interim periods beginning after December 15, 2018. The guidance is required to be adopted using a modified retrospective approach applied to leases existing at the date of initial application.

The new standard is effective for the Company on January 1, 2019, with early adoption permitted. An entity may choose to use either (1) its effective date or (2) the beginning of the earliest comparative period presented in the financial statements as its date of initial application. We expect to adopt the new standard on January 1, 2019 and use the effective date as our date of initial application. Consequently, financial information will not be restated, and the disclosures required under the new standard will not be provided for dates and periods prior to January 1, 2019. The new standard provides a number of optional practical expedients in transition. We expect we will elect to utilize the available package of practical expedients permitted under the transition guidance within the new standard, which does not require the reassessment of the following: (i) whether existing or expired arrangements are or contain a lease, (ii) the lease classification of existing or expired leases, and (iii) whether previous initial direct costs would qualify for capitalization under the new lease standard. Further, we expect to utilize the short-term lease exemption for all leases with a lease term of 12 months or less for purposes of applying the recognition and measurements requirements in the new standard.

In preparation for the adoption of the standard, we implemented internal controls and processes to enable the preparation of financial information including the assessment of the impact of the standard. Our analysis includes, but is not limited to, assessing its existing lease and service contracts, determining the appropriate discount rates to apply to its leases in order to determine the impact that the new leasing standards may have on our consolidated statements of operations, financial position and disclosures. Further, we are establishing policies and procedures in order to adhere to the requirements of the new standard, which includes enhanced disclosure requirements. While we continue to assess all of the impacts of the adoption of the new standard, we currently expect to recognize additional lease liabilities and right-of-use assets for our operating leases as of January 1, 2019 which will have a material impact to our consolidated balance sheets. Refer to Note 16, *Commitments and Contingencies*, for further detail regarding our operating leases. We do not expect that the new standard will have a material impact to our consolidated statements of operations or cash flows.

In October 2016, the FASB issued ASU No. 2016-16, *Intra-Entity Transfers of Assets Other Than Inventory*, or ASU 2016-16. The amendments in ASU 2016-16 require an entity to recognize the income tax consequences of intra-entity transfers of assets other than inventory at the time that the transfer occurs. Current guidance does not require recognition of tax consequences until the asset is eventually sold to a third party. ASU 2016-16 is effective for fiscal years, and interim periods beginning after December 15, 2017. Early adoption is permitted as of the first interim period presented in a year. A reporting entity must apply the amendments in ASU 2016-16 using a modified retrospective approach by recording a cumulative-effect adjustment to equity as of the beginning of the fiscal year of adoption. We adopted this standard on January 1, 2018 and such adoption did not have a material impact on our consolidated financial statements.

In January 2017, the FASB issued ASU No. 2017-04, *Simplifying the Test for Goodwill Impairment*, or ASU 2017-04. The amendments in ASU 2017-04 eliminate the current two-step approach used to test goodwill for impairment and require an entity to apply a one-step quantitative test and record the amount of goodwill impairment as the excess of a reporting unit's carrying amount over its fair value, not to exceed the total amount of goodwill allocated to the reporting unit. ASU 2017-04 is effective for fiscal years and interim periods beginning after December 15, 2019 (upon the first goodwill impairment test performed during that fiscal year). Early adoption is permitted for interim or annual goodwill impairment tests performed on testing dates after January 1, 2017. A reporting entity must apply the amendments in ASU 2017-04 using a prospective approach. We do not expect the adoption of ASU 2017-04 to have a material impact to its consolidated financial position or results of operations.

In May 2017, the FASB issued ASU 2017-09, *Compensation – Stock Compensation (Topic 718): Scope Modification Accounting*. The new standard is intended to reduce the diversity in practice and cost and complexity when applying the guidance in Topic 718 to a change to the terms or conditions of a share-based payment award. The new standard was effective beginning January 1, 2018. The adoption of this standard did not have a material impact on our financial position or results of operations upon adoption. In June 2018, the FASB issued ASU 2018-07. The new standard simplifies the accounting for share-based payments to non-employees by aligning it with the accounting for share-based payments to employees, with certain exceptions. The new standard became effective beginning January 1, 2019 and early adoption is permitted. We adopted the standard on January 1, 2019. The adoption of these standards is not expected to have a material impact on our consolidated financial position or results of operations upon adoption.

Contractual Obligations and Commitments

The following table summarizes our contractual obligations as of December 31, 2018 and the effect such obligations are expected to have on our liquidity and cash flow in future years (in thousands):

	Total	Less than 1 year	1 to 3 years	3 to 5 years	More than 5 years
Operating lease obligations	$ 4,720	$ 1,156	$ 2,650	$ 914	$ —
Licenses	250	25	50	50	125
Long-term debt	70,000	—	70,000	—	—
Convertible Senior Subordinated Notes (a)	165,000	—	165,000	—	—
Total contractual cash obligations	$ 239,970	$ 1,181	$ 237,700	$ 964	$ 125

(a) See Note 14, *Long-term Debt*, for additional information.

Leases

We lease our Boston, Massachusetts and King of Prussia, Pennsylvania office spaces under non-cancelable operating leases expiring in 2021 and 2024, respectively.

We entered into the original King of Prussia and Boston leases in January 2015 and April 2015, respectively. The lease terms under the original agreements were for six and four years, respectively. Each agreement had one renewal option for an extended term. The King of Prussia and Boston lease terms under the original agreements began in June 2015 and July 2015, respectively.

We executed an amended lease agreement on our Boston office space in July 2016. The amended lease agreement added 4,153 rentable square feet of office space and extended the original lease term by two years. The total revised lease commitment of $3.4 million is over a remaining four-year lease term. In accordance with the amended lease agreement, we paid a security deposit of $0.1 million. We are required to make additional payments under the facility operating leases for taxes, insurance, and other operating expenses incurred during the lease period. In addition, the lease provided an incentive from the landlord of up to $0.2 million in tenant improvements. We capitalized all leasehold improvements as fixed assets. Accordingly, we also recorded a related financing obligation in “other long-term liabilities” on our consolidated balance sheet. These amounts will be treated as a reduction to rent expense over the lease term. Subsequent to the amended lease agreement, we will record monthly rent expense of approximately $54,000 for the Boston office space.

We executed an amended lease agreement on our King of Prussia office space in October 2016. The amended lease agreement is for 19,708 rentable square feet of office space, for a total commitment of $3.3 million with respect to which lease payments became due beginning once we took control of such office space during the first quarter of 2017. The total lease commitment is over a seven-year and seven-month lease term. The amended lease agreement contains rent escalation and a partial rent abatement period, which is accounted for as rent expense under the straight-line method. We are required to make additional payments under the facility operating leases for taxes, insurance, and other operating expenses incurred during the operating lease period.

Licenses

Under a license agreement with Tufts University, or Tufts, we were required to make aggregate regulatory milestone payments of up to $300,000 associated with the first Phase 3 clinical trials, filing of an NDA, and approval of its first product candidate, all of which have been paid. We are also obligated to pay Tufts a minimum royalty payment in the amount of $25,000 per year. We also agreed to pay Tufts royalties based on gross sales of products, as defined in the agreement, ranging in the low single digits depending on the applicable field of use for such product sale. Also, if we enter into a sublicense under the agreement, based on the applicable field of use for such product, we agreed to pay Tufts a percentage, ranging from 10% to 14 % for compounds other than omadacycline, and a percentage in the single digits for the compound omadacycline, of that portion of any sublicense issue fees or maintenance fees received by us that are reasonably attributable to the sublicense of the rights granted to us under the Tufts License Agreement and the lesser of a percentage, ranging from the low tens to the high twenties based on the applicable field of use for such product, of the royalty payments made to us by the sublicensee or the amount of royalty payments that would have been paid by us to Tufts if we had sold the products. We paid a sublicense issue fee in the low six figures to Tufts during the year ended December 31, 2017 upon earning the $7.5 million upfront payment under the Zai Collaboration Agreement.

In September 2009, we and Novartis International Pharmaceutical Ltd., or Novartis, entered into a Collaborative Development, Manufacture and Commercialization License Agreement, or the Novartis Agreement, which provided Novartis with a global, exclusive patent and technology license for the development, manufacturing and marketing of omadacycline. The Novartis Agreement was terminated by Novartis without cause in June 2011 and the termination was effective 60 days later. We and Novartis subsequently entered in a letter agreement in January 2012, or the Novartis Letter Agreement, as amended, pursuant to which we reconciled shared development costs and expenses and granted Novartis a right of first negotiation with respect to commercialization rights of omadacycline following approval of omadacycline from the FDA, EMA, or any regulatory agency, but only to the extent we had not previously granted such commercialization rights related to omadacycline to another third party as of any such approval. We also agreed to pay Novartis a 0.25% royalty based on annual net sales of our omadacycline products. The amended Novartis Letter Agreement resulted in a long-term liability in the amount of $3.6 million for the year ended December 31, 2018 and 2017 included within “Other Long-Term Liabilities” on our consolidated balance sheet. There are no other payment obligations to Novartis under either the Novartis Agreement or the amended Novartis Letter Agreement.

Long-Term Debt

Loan Agreement

On September 30, 2015, we entered into a Loan and Security Agreement, or the Hercules Loan Agreement, with Hercules Technology II, L.P. and Hercules Technology III, L.P, together, Hercules, and certain other lenders and Hercules Technology Growth Capital, Inc. (as agent). We executed five amendments to the Hercules Loan Agreement subsequent to September 30, 2015. On August 1, 2018, we entered into the Fifth Amendment to the Hercules Loan Agreement. The Fifth Amendment increased the amount that we may borrow by $30.0 million, from up to $60.0 million to up to $90.0 million, in multiple tranches. Prior to the Fifth Amendment, we borrowed the full $60.0 million that was available to us. Concurrently with the closing of the Fifth Amendment, we borrowed the Fifth Tranche of $10.0 million. Two additional tranches of up to $10.0 million each ($20.0 million total), or the Additional Tranches, may be available to us, subject to determination by Hercules, in its sole discretion, whether to provide such tranches. As such there can be no assurance as to whether or not the Additional Tranches shall be funded. The Fifth Amendment extended the date on which we are required to begin making monthly principal installments on loans previously outstanding under the Hercules Loan Agreement, or the Prior Tranches, from January 1, 2019 to January 1, 2021, subject to our receipt of marketing approval for omadacycline, or the Interest Only Period Extension Event, which was obtained on October 2, 2018. Beginning on January 1, 2021, the Company is obligated to make payments in equal monthly installments of principal and interest with respect to the Prior Tranches. The Prior Tranches mature on September 1, 2021, due to the achievement of the Interest Only Period Extension Event. With respect to the $10 million loan made to the Company upon the execution of the Fifth Amendment, the Company is obligated to make payments in equal monthly installments of principal and interest beginning on September 1, 2020 (subject to extension to March 1, 2021 or September 1, 2021) upon achievement of specified levels of omadacycline revenue, and such loan matures on August 1, 2022.

To date, we have issued to each of Hercules Technology II, L.P. and Hercules Technology III, L.P., a warrant to purchase 16,346 shares of our common stock (32,692 shares of common stock in total) at an exercise price of $24.47 per share and a warrant to purchase 18,574 shares of our common stock (37,148 shares of common stock in total) at an exercise price of $13.46 per share. We issued a warrant to Hercules Capital, Inc. that is exercisable for an aggregate of 5,374 shares of our common stock at an exercise price of $23.26 per share. We have also issued to Hercules Capital, Inc. a warrant to purchase up to 19,627 shares of its common stock at an exercise price of $10.19 per share.

As of December 31, 2018 and 2017, we have recorded a long-term debt obligation of $229.0 million, net of debt discount of $6.0 million and $59.2 million, net of debt discount of $0.8 million, respectively. Debt issuance costs are presented on the consolidated balance sheet as a direct deduction from the related debt liability rather than capitalized as an asset in accordance with ASU No. 2015-03, *Interest - Imputation of Interest (Subtopic 835-30): Simplifying the Presentation of Debt Issuance Costs*.

Convertible Senior Subordinated Notes

On April 18, 2018, we entered into the Purchase Agreement with the Initial Purchasers for whom Merrill Lynch, Pierce, Fenner & Smith Incorporated and Leerink Partners LLC acted as representatives, relating to the sale of the Notes to the Initial Purchasers. We also granted the Initial Purchasers an option to purchase up to an additional $25.0 million aggregate principal amount of Notes, which was exercised in full on April 20, 2018.

The Purchase Agreement includes customary representations, warranties and covenants. Under the terms of the Purchase Agreement, we agreed to indemnify the Initial Purchasers against certain liabilities.

In addition, J. Wood Capital Advisors LLC, our financial advisor, purchased $5.0 million aggregate principal amount of Notes in a separate, concurrent private placement on the same terms as other investors.

The Notes were issued by us on April 23, 2018, pursuant to an Indenture, dated as of such date, or the Indenture, between us and U.S. Bank National Association, as trustee, or the Trustee. The Notes bear cash interest at the annual rate of 4.75%, payable on November 1 and May 1 of each year, beginning on November 1, 2018, and mature on May 1, 2024 unless earlier repurchased, redeemed or converted. We will settle conversions of the Notes through delivery of shares of our common stock in accordance with the terms of the Indenture. The initial conversion rate for the Notes is 62.8931 shares of common stock (subject to adjustment as provided for in the Indenture) per $1,000 principal amount of the Notes, which is equal to an initial conversion price of approximately $15.90 per share, representing a conversion premium of approximately 20% above the closing price of the common stock of $13.25 per share on April 18, 2018.

Holders of the Notes may convert all or any portion of their Notes, in multiples of $1,000 principal amount, at their option at any time prior to the close of business on the second scheduled trading day immediately preceding the stated maturity date.

We may not redeem the Notes prior to May 6, 2021. We may redeem for cash all or part of the Notes, at its option, on or after May 6, 2021 if the last reported sale price of our common stock has been at least 130% of the conversion price then in effect for at least 20 trading days (whether or not consecutive) during any 30 consecutive trading day period (including the last trading day of such period) ending on, and including, the trading day immediately preceding the date on which we provides notice of redemption at a redemption price equal to 100% of the principal amount of the Notes to be redeemed, plus accrued and unpaid interest to, but excluding, the redemption date.

If we experience a fundamental change, as described in the Indenture, prior to the maturity date of the Notes, holders of the Notes will, subject to specified conditions, have the right, at their option, to require us to repurchase for cash all or a portion of their Notes at a repurchase price equal to 100% of the principal amount of the Notes to be repurchased, plus accrued and unpaid interest, if any, to, but not including, the fundamental change repurchase date. In addition, following certain corporate events that occur prior to the maturity date of the Notes and following a notice of redemption of the notes, we will increase the conversion rate for a holder who elects to convert its Notes in connection with such corporate event or redemption.

The Indenture provides for customary events of default. In the case of an event of default with respect to the Notes arising from specified events of bankruptcy or insolvency, all outstanding Notes will become due and payable immediately without further action or notice. If any other event of default with respect to the Notes under the Indenture occurs or is continuing, the Trustee or holders of at least 25% in aggregate principal amount of the then outstanding Notes may declare the principal amount of the Notes to be immediately due and payable.

In certain circumstances if, at any time during the six-month period beginning on, and including, the date that is six months after the last date of original issuance of the Notes, we fail to timely file certain documents or reports required under the Securities Exchange Act of 1934, as amended, or the Notes are not otherwise freely tradable by holders of the Notes other than our affiliates or holders that were our affiliates at any time during the three months immediately preceding, additional interest will accrue on the Notes during the first 90-day period in which its failure to file has occurred and is continuing or such Notes are not otherwise freely tradable by holders other than the our affiliates (or holders that were our affiliates at any time during the three months immediately preceding).

In addition, if, and for so long as, the restrictive legend on the Notes has not been removed, the Notes are assigned a restricted CUSIP number or the Notes are not otherwise freely tradable by holders other than our affiliates or holders that were our affiliates at any time during the three months immediately preceding (without restrictions pursuant to U.S. securities laws or the terms of the Indenture or the Notes) as of the 380th day after the last date of original issuance of the Notes, we will pay additional interest on the Notes outstanding during the period in which the Notes remain so restricted.

After deducting costs incurred of $6.0 million, we raised net proceeds from the issuance of long-term convertible debt of $159.0 million in April 2018. All costs were deferred and are being amortized over the life of the Notes at an effective interest rate of 5.47% and recorded as additional interest expense.

Contract Service Providers

In the course of normal business operations, we also have agreements with contract service providers to assist in the performance of research and development, clinical trials, manufacturing and other activities for operating purposes which are cancelable at any time by us, generally upon 30 days' prior written notice. These payments are not included in this table of contractual obligations.

We could also enter into additional collaborative research, contract research, manufacturing, supplier and contractor agreements in the future, which may require upfront payments and/or long-term commitments of cash.

Commercial Supply Agreements

We have entered into multiple commercial supply agreements. Please refer to Item 1, *Business*, for further details on our agreements.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

We do not enter into financial instruments for trading or speculative purposes. Our cash, cash equivalents and investments balance as of December 31, 2018 consisted of cash and cash equivalents and U.S. treasury securities. The goals of our investment policy are preservation of capital, fulfillment of liquidity needs and fiduciary control of cash and investments. We also seek to maximize income from our investments without assuming significant risk. Our primary exposure to market risk is interest income sensitivity, which is affected by changes in the general level of interest rates, particularly because our investments are in short-term marketable securities. Due to the short-term duration of our investment portfolio and the low-risk profile of our investments, an immediate 100 basis point change in interest rates would not have a material effect on the fair market value of our portfolio. We have the ability and intention to hold our investments until maturity and, therefore, we would not expect our operating results or cash flows to be affected to any significant degree by the effect of a sudden change in market interest rates on our investment portfolio.

We engage CROs and contract manufacturers on a global scale. We may be subject to fluctuations in foreign currency rates in connection with certain of these agreements. We currently do not hedge any such foreign currency exchange rate risk. Transactions denominated in currencies other than U.S. dollars are recorded based on exchange rates at the time such transactions arise and were less than 10% of total liabilities as of December 31, 2018.

Item 8. Financial Statements and Supplementary Data

Index to Financial Statements

Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Paratek Pharmaceuticals, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Paratek Pharmaceuticals, Inc. (the Company) as of December 31, 2018 and 2017, the related consolidated statements of operations and comprehensive loss, stockholders' equity, and cash flows for the years then ended, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2018 and 2017, and the results of its operations and its cash flows for the years then ended, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework), and our report dated March 5, 2019 expressed an unqualified opinion thereon.

Adoption of ASU No. 2014-09, *Revenue from Contracts with Customers*

As discussed in Note 2 to the consolidated financial statements, the Company changed its method of accounting for revenue in 2018 due to the adoption of Accounting Standards Update (ASU) No. 2014-09, *Revenue from Contracts with Customers* (Topic 606), and the related amendments.

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 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. 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/ Ernst & Young LLP

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

Boston, Massachusetts
March 5, 2019

Paratek Pharmaceuticals, Inc.
Consolidated Balance Sheets
(in thousands, except for share and par value amounts)

	December 31,	
	2018	2017
Assets		
Current assets		
Cash and cash equivalents	$ 46,987	$ 35,416
Marketable securities	203,364	116,307
Restricted cash	266	162
Accounts receivable	41	5,041
Other receivables	208	848
Prepaid and other current assets	4,377	2,712
Total current assets	255,243	160,486
Long-term restricted cash	249	250
Long-term marketable securities	42,487	—
Fixed assets, net	1,173	1,711
Intangible assets, net	—	142
Goodwill	829	829
Other long-term assets	211	280
Total assets	$ 300,192	$ 163,698
Liabilities and Stockholders' Equity		
Current liabilities		
Accounts payable	$ 2,090	$ 3,555
Other accrued expenses	12,835	8,270
Accrued manufacturing	2,784	4,964
Total current liabilities	17,709	16,789
Long-term debt	228,959	59,186
Contingent obligations	—	71
Other liabilities	5,946	5,174
Total liabilities	252,614	81,220
Commitments and contingencies (Note 16)		
Stockholders' equity		
Preferred stock:		
Undesignated preferred stock: $0.001 par value; 5,000,000 authorized; no shares issued and outstanding	—	—
Common stock, $0.001 par value, 100,000,000 shares authorized, 32,259,363 and 27,941,015 issued and outstanding at December 31, 2018 and 2017, respectively	32	28
Additional paid-in capital	630,142	552,720
Accumulated other comprehensive loss	(128)	(158)
Accumulated deficit	(582,468)	(470,112)
Total stockholders' equity	47,578	82,478
Total liabilities and stockholders' equity	$ 300,192	$ 163,698

The accompanying notes are an integral part of these consolidated financial statements.

Paratek Pharmaceuticals, Inc.
Consolidated Statements of Operations and Comprehensive Loss
(in thousands, except share and per share amounts)

	Year Ended December 31,	
	2018	**2017**
Revenue		
Collaboration and royalty revenue	$ 17,117	$ 12,616
Total revenue	17,117	12,616
Operating expenses:		
Research and development	57,508	60,072
General and administrative	63,658	36,965
Impairment of intangible assets	107	743
Changes in fair value of contingent consideration	(71)	(584)
Total operating expenses	121,202	97,196
Loss from operations	(104,085)	(84,580)
Other income and expenses:		
Interest income	3,260	1,377
Interest expense	(10,985)	(5,079)
Other losses	(44)	(34)
Net loss before provision for income taxes	(111,854)	(88,316)
Provision for income taxes	502	753
Net loss	$ (112,356)	$ (89,069)
Other comprehensive loss		
Unrealized gain (loss) on available-for-sale securities, net of tax	30	(142)
Other comprehensive income (loss)	30	(142)
Comprehensive loss	$ (112,326)	$ (89,211)
Net loss per share:		
Basic and diluted net loss per share	$ (3.57)	$ (3.32)
Weighted average common shares outstanding		
Basic and diluted	31,513,454	26,827,253

The accompanying notes are an integral part of these consolidated financial statements.

Paratek Pharmaceuticals, Inc.
Consolidated Statements of Stockholders' Equity
(in thousands, except share amounts)

	Common Stock		Additional Paid-in Capital	Accumulated Other Comprehensive Income (loss)	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount				
Balances at December 31, 2016	23,358,637	$ 23	$ 451,947	$ (16)	$ (380,362)	$ 71,592
Exercise of stock options	66,455	—	320	—	—	320
Issuance of common stock, net of expenses	4,332,126	5	82,791	—	—	82,796
Vesting of restricted stock unit awards	183,797	—	—	—	—	—
Issuance of warrants for common stock	—	—	79	—	—	79
Retroactive adjustment to beginning accumulated deficit and additional paid-in capital resulting from adoption of ASU 2016-09	—	—	681	—	(681)	—
Unrealized loss on available-for-sale securities, net of tax	—	—	—	(142)	—	(142)
Stock-based compensation expense	—	—	16,902	—	—	16,902
Net loss	—	—	—	—	(89,069)	(89,069)
Balances at December 31, 2017	27,941,015	$ 28	$ 552,720	$ (158)	$ (470,112)	$ 82,478
Exercise of stock options	53,938	—	$ 286	—	—	286
Issuance of common stock, net of expenses	3,301,436	3	51,514	—	—	51,517
Vesting of restricted stock unit awards	962,974	1	(1)	—	—	—
Issuance of warrants for common stock	—	—	130	—	—	130
Employee stock purchase plan expense	—	—	7	—	—	7
Unrealized gain on available-for-sale securities, net of tax	—	—	—	30	—	30
Stock-based compensation expense	—	—	25,486	—	—	25,486
Net loss	—	—	—	—	(112,356)	(112,356)
Balances at December 31, 2018	32,259,363	$ 32	$ 630,142	$ (128)	$ (582,468)	$ 47,578

The accompanying notes are an integral part of these consolidated financial statements.

Paratek Pharmaceuticals, Inc.
Consolidated Statements of Cash Flows
(in thousands)

	Year Ended December 31,	
	2018	**2017**
Net loss	$ (112,356)	$ (89,069)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation, amortization and accretion	(1,067)	1,268
Stock-based compensation expense	25,486	16,902
Noncash interest expense	2,792	406
Impairment of intangible assets	107	743
Employee stock purchase plans	7	—
Change in fair value of contingent consideration	(71)	(584)
Changes in operating assets and liabilities		
Accounts receivable, prepaid, and other current assets	4,440	(4,833)
Purchase of prepaid interest - marketable securities	(715)	—
Accounts payable and accrued expenses	(641)	(4,223)
Other liabilities and other assets	839	816
Net cash used in operating activities	(81,179)	(78,574)
Investing activities		
Purchase of fixed assets	(60)	(1,117)
Purchase of marketable securities	(292,864)	(180,289)
Proceeds from maturities of marketable securities	165,050	131,250
Proceeds from sales of marketable securities	—	7,499
Net cash used in investing activities	(127,874)	(42,657)
Financing activities		
Proceeds from issuance of long-term convertible debt, net of costs	158,974	320
Proceeds from issuance of long-term debt, net of costs	9,950	19,915
Proceeds from exercise of stock options	286	82,795
Proceeds from issuance of common stock, net	51,517	—
Net cash provided by financing activities	220,727	103,030
Net increase (decrease) in cash, cash equivalents and restricted cash	11,674	(18,201)
Cash, cash equivalents and restricted cash at the beginning of period	35,828	54,029
Cash, cash equivalents and restricted cash at end of period	$ 47,502	$ 35,828
Supplemental disclosure of noncash financing activities		
Fair value of warrants issued	$ 130	$ 79
Supplemental disclosure of cash flow information		
Cash paid for interest	$ 9,310	$ 3,705

The accompanying notes are an integral part of these consolidated financial statements.

1. Organization

Paratek Pharmaceuticals, Inc., or the Company or Paratek, is a Delaware corporation with its corporate office in Boston, Massachusetts and an office in King of Prussia, Pennsylvania.

The Company is a commercial-stage biopharmaceutical company focused on the development and commercialization of innovative therapeutics. The Company's United States Food & Drug Administration-, or FDA-, approved commercial product, NUZYRA™ (omadacycline) is a once-daily intravenous and oral antibiotic for the treatment of adult patients with community-acquired bacterial pneumonia, or CABP, and acute skin and skin structure infections, or ABSSSI, caused by susceptible pathogens. The Company launched NUZYRA in the United States in February 2019. The Company is also studying NUZYRA for the treatment of urinary tract infections, or UTI. SEYSARA™ (sarecycline) is an FDA-approved product, with respect to which the Company has exclusively licensed in the United States development and commercialization rights to Almirall, LLC, or Almirall. Almirall launched SEYSARA in the U.S. in January 2019 and it is currently being marketed by Almirall in the United States as a new once-daily oral therapy for the treatment of moderate to severe acne vulgaris. The Company retains development and commercialization rights with respect to sarecycline in the rest of the world.

The Company has incurred significant losses since inception in 1996. The Company has generated an accumulated deficit of $582.5 million through December 31, 2018 and will require substantial additional funding in connection with the Company's continuing operations to support development and commercial activities associated with NUZYRA. Based upon the Company's current operating plan, it anticipates that cash, cash equivalents and available for sale marketable securities of $292.8 million as of December 31, 2018 will enable the Company to fund operating expenses and capital expenditure requirements through at least the next twelve months from the filing date of this Annual Report on Form 10-K. The Company expects to finance future cash needs primarily through a combination of product sales, public or private equity offerings, debt or other structured financings, strategic collaborations and grant funding. The Company is subject to risks common to companies in the biopharmaceutical industry, including, but not limited to, risks of failure of preclinical studies and clinical trials, the need to obtain additional financing to fund the future development of the Company's product candidates, the need to obtain compliant product from third party manufacturers, the need to obtain marketing approval for the Company's product candidates, the need to successfully commercialize and gain market acceptance of product candidates, the risks of manufacturing product with an external supply chain, dependence on key personnel, and compliance with government regulations.

2. Summary of Significant Accounting Policies

Basis of Presentation

The consolidated financial statements have been prepared in accordance with U.S. GAAP as found in the Accounting Standards Codification, or ASC, and Accounting Standards Update, or ASU, of the Financial Accounting Standards Board, or FASB, and pursuant to the rules and regulations of the U.S. Securities and Exchange Commission, or the SEC. Beginning January 1, 2018, the Company presented "accrued contract manufacturing costs" as a separate line item on its condensed consolidated balance sheet. As such, the Company reclassified the December 31, 2017 accrued contract manufacturing costs balance of $5.0 million, from "other accrued expenses" into "accrued contract manufacturing costs". Beginning on January 1, 2018, the Company also reclassified the balance of "accrued contract research" of $2.4 million as of December 31, 2017, previously presented as a separate line within the Company's consolidated balance sheet, into "other accrued expenses" on the condensed consolidated balance sheet.

Principles of Consolidation

The accompanying audited condensed consolidated financial statements include the results of operations of Paratek Pharmaceuticals, Inc. and its wholly-owned subsidiaries, Paratek Pharma, LLC, Paratek Securities Corporation, Transcept Pharma, Inc., Paratek UK, Ltd, Paratek Bermuda, Ltd., and Paratek Ireland Limited. All significant intercompany accounts and transactions have been eliminated in consolidation.

Use of Estimates

The preparation of consolidated financial statements in conformity with U.S. GAAP requires management of the Company to make certain estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. These estimates are based on management's best knowledge of current events and actions the Company may

undertake in the future. Management considers many factors in selecting appropriate financial accounting policies and controls, and in developing the estimates and assumptions that are used in the preparation of these financial statements. Management must apply significant judgment in this process. In addition, other factors may affect estimates, including: expected business and operational changes, sensitivity and volatility associated with the assumptions used in developing estimates, and whether historical trends are expected to be representative of future trends. The estimation process often may yield a range of potentially reasonable estimates of the ultimate future outcomes and management must select an amount that falls within that range of reasonable estimates. This process may result in actual results differing materially from those estimated amounts used in the preparation of the financial statements. Estimates are used in accounting for, among other items, inventory, intangible assets, goodwill, contingent liabilities, stock-based compensation arrangements, manufacturing and clinical accruals, useful lives for depreciation and amortization of long-lived assets and valuation allowances on deferred tax assets. Actual results could differ from those estimates. The Company evaluates its estimates on an ongoing basis. Changes in estimates are reflected in reported results in the period in which they become known by the Company's management.

Statement of Cash Flows

On January 1, 2018, the Company adopted ASU No. 2016-18, *Statement of Cash Flows (Topic 230) Restricted Cash*, or ASU 2016-18. The Company's restricted cash is now included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the Company's condensed consolidated statement of cash flows. The following table provides a reconciliation of cash, cash equivalents, and restricted cash reported within the condensed consolidated statement of cash flows that sum to the total of the same such amounts shown in the condensed consolidated statement of cash flows.

	December 31, 2018	December 31, 2017	December 31, 2016
Cash and cash equivalents	$ 46,987	$ 35,416	$ 52,962
Short-term restricted cash	266	162	817
Long-term restricted cash	249	250	250
Total cash, cash equivalents and restricted cash shown on the condensed consolidated statement of cash flows	$ 47,502	$ 35,828	$ 54,029

Cash and Cash Equivalents and Marketable Securities

The Company considers all highly liquid investments purchased with original maturities of 90 days or less at acquisition to be cash equivalents. Cash and cash equivalents include cash held in banks and amounts held primarily in interest-bearing money market accounts. Cash equivalents are carried at cost, which approximates their fair market value.

The Company determines the appropriate classification of marketable securities at the time of purchase and reevaluates such designation at each balance sheet date. The Company classified all of its marketable securities at December 31, 2018 as "available-for-sale" pursuant to ASC 320, *Investments – Debt and Equity Securities.* Investments not classified as cash equivalents are presented as either short-term or long-term investments based on both their maturities as well as the time period the Company intends to hold such securities. Available-for-sale securities are maintained by an investment manager and consist of U.S. treasury and government agency securities. Available-for-sale securities are carried at fair value with the unrealized gains and losses included in other comprehensive income (loss) as a component of stockholders' equity until realized. Any premium or discount arising at purchase is amortized or accreted to interest expense or income over the life of the instrument. Realized gains and losses are determined using the specific identification method and are included in other income or expense. There were no material realized gains or losses on marketable securities recognized for the years ended December 31, 2018 and 2017.

The Company reviews marketable securities for other-than-temporary impairment whenever the fair value of a marketable security is less than the amortized cost and evidence indicates that a marketable security's carrying amount is not recoverable within a reasonable period of time. Other-than-temporary impairments of investments are recognized in the consolidated statements of operations and comprehensive loss if the Company has experienced a credit loss, has the intent to sell the marketable security, or if it is more likely than not that the Company will be required to sell the marketable security before recovery of the amortized cost basis. Evidence considered in this assessment includes reasons for the impairment, compliance with the Company's investment policy, the severity and duration of the impairment and changes in value subsequent to the end of the period. There were no other-than-temporary impairments of investments recognized for the years ended December 31, 2018 and 2017.

Fair Value of Financial Instruments

The Company is required to disclose information on all assets and liabilities reported at fair value that enables an assessment of the inputs used in determining the reported fair values. FASB ASC 820, *Fair Value Measurements and Disclosures*, or ASC 820, establishes a hierarchy of inputs used in measuring fair value that maximizes the use of observable inputs and minimizes the use of unobservable inputs by requiring that the observable inputs be used when available. Observable inputs are those that market participants would use in pricing the asset or liability based on market data obtained from sources independent of the Company. Unobservable inputs reflect the Company's assumptions about the inputs that market participants would use in pricing the asset or liability and are developed based on the best information available in the circumstances. The fair value hierarchy applies only to the valuation inputs used in determining the reported fair value of the investments and is not a measure of the investment credit quality. The three levels of the fair value hierarchy are described below:

Level 1—Valuations based on unadjusted quoted prices in active markets for identical assets or liabilities that the Company has the ability to access at the measurement date.

Level 2—Valuations based on quoted prices for similar assets or liabilities in markets that are not active or for which all significant inputs are observable, either directly or indirectly.

Level 3—Valuations that require inputs that reflect the Company's own assumptions that are both significant to the fair value measurement and unobservable.

To the extent that valuation is based on models or inputs that are less observable or unobservable in the market, the determination of fair value requires more judgment. Accordingly, the degree of judgment exercised by the Company in determining fair value is greatest for instruments categorized in Level 3. A financial instrument's level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement.

Restricted Cash

Cash accounts with any type of restriction are classified as restricted cash. If restrictions are expected to be lifted in the next twelve months, the restricted cash account is classified as current.

Concentration of Credit Risk

Financial instruments that subject the Company to credit risk consist primarily of cash, restricted cash, and accounts receivable. The Company places its cash in an accredited financial institution and this balance is above federally insured amounts. The Company has no off-balance sheet concentrations of credit risk such as foreign currency exchange contracts, option contracts or other hedging arrangements. For the year ended December 31, 2018, revenue consisted of upfront fees and milestone payments received in connection with the Company's collaboration agreements with Almirall and Zai Lab (Shanghai) Co., Ltd., or Zai, and royalty income pursuant to the royalty sharing agreement, or the Royalty Sharing Agreement, entered into by the Company in October 2016 with the Special Committee of the Company's Board of Directors, or the Special Committee. For the year ended December 31, 2017, revenue consisted of upfront fees and milestone payments received in connection with the Company's collaboration agreements with Almirall or Zai, and royalty income pursuant to the Royalty Sharing Agreement. For the year ended December 31, 2018, Almirall and Zai represented approximately 70% and 29%, respectively, of collaboration and royalty income.

Fixed Assets

Fixed assets, including leasehold improvements, are recorded at cost and depreciated when placed into service using the straight-line method, based on their estimated useful lives as follows:

	Estimated useful Life In Years
Laboratory equipment	5
Office equipment	5
Computer equipment	3
Computer software	3

In addition, leasehold improvements are depreciated over the shorter of their estimated useful lives or the term of the respective lease on a straight-line basis.

Costs for capital assets not yet placed into service have been capitalized as construction-in-progress and will be depreciated in accordance with the above guidelines once placed into service. The Company reviews its long-lived assets for impairment whenever events or changes in business circumstances indicate that the carrying amount of assets may not be fully recoverable or that the useful lives of these assets are no longer appropriate. Each impairment test is based on a comparison of the undiscounted cash flow to the recorded value of the asset. If impairment is indicated, the asset will be written down to its estimated fair value on a discounted cash flow basis. Upon sale or retirement, the asset cost and related accumulated depreciation are removed from the respective accounts, and any related gain or loss is reflected in results of operations. Repair and maintenance costs are expensed as incurred.

Inventory

Inventories are stated at the lower of cost or estimated net realizable value, on a first-in, first-out basis. Prior to the regulatory approval of its product candidates, the Company incurs expenses for the manufacture of drug product that could potentially be available to support the commercial launch of its products. Until the first reporting period when regulatory approval has been received or is otherwise considered probable, the Company records all such costs as research and development expense. Inventory used in clinical trials is also expensed as research and development expense, when selected for such use. The Company performs an assessment of the recoverability of capitalized inventory during each reporting period and writes down any excess and obsolete inventory to its net realizable value in the period in which the impairment is first identified. Such impairment charges, should they occur, are recorded as a component of cost of product sales in the consolidated statements of operations and comprehensive loss. The determination of whether inventory costs will be realizable requires the use of estimates by management. If actual market conditions are less favorable than projected by management, additional write-downs of inventory may be required. As of December 31, 2018, the Company capitalized $0.6 million in inventory, which is included in prepaid and other current assets on the consolidated balance sheet.

Valuation of Other Long-Lived Intangible Assets

The Company's finite-lived intangible assets are stated at cost less accumulated amortization. The Company calculates amortization expense by the straight-line method using estimated useful lives of the related assets. The Company reviews finite-lived assets for impairment whenever events or changes in circumstances occur that indicate that the carrying amount of an asset (or asset group) may not be recoverable. The Company's impairment review is based on an estimate of the undiscounted cash flows at the lowest level for which identifiable cash flows exist and impairment occurs when the book value of the asset exceeds the estimated future undiscounted cash flows generated by the asset. When an impairment is indicated, a charge is recorded for the difference between the book value of the asset and its fair value. Depending on the asset, estimated fair value may be determined either by use of a discounted cash flow model, or by reference to estimated selling values of assets in a similar condition.

In accordance with the Company's policy, the Company reviews the estimated useful lives of its long-lived intangible assets on an ongoing basis.

Valuation of Goodwill

The Company tests for goodwill impairment annually, on October 1, unless there are indications during an interim period that these assets are more likely than not to have become impaired. The first step of the goodwill impairment test is to compare the fair value of a reporting unit to its carrying amount to determine if there is potential impairment. If the fair value of the reporting unit is less than its carrying value, the second step of the goodwill impairment test is performed to measure the amount of impairment loss.

The second step of the goodwill impairment test compares the implied fair value of a reporting unit's goodwill with the carrying amount of that goodwill. If the carrying amount of a reporting unit's goodwill exceeds the implied fair value of that goodwill, an impairment loss is recognized in an amount equal to that excess. The implied fair value of goodwill is determined in the same manner as the amount of goodwill recognized in a business combination. That is, the fair value of the reporting unit is allocated to all of the assets and liabilities of that unit (including any unrecognized intangible assets) as if the reporting unit had been acquired in a business combination and the fair value was the purchase price paid to acquire the reporting unit.

Determining the fair value of a reporting unit under the first step of the goodwill impairment test and determining the fair value of individual assets and liabilities of a reporting unit (including unrecognized intangible assets) under the second step of the goodwill impairment test is inherently subjective in nature and often involves the use of significant estimates and assumptions based on known facts and circumstances at the time we perform the valuation. The use of different assumptions, inputs and judgments or changes in circumstances could materially affect the results of the valuation and could have a significant impact on whether or not an impairment charge is recognized and the magnitude of any such charge. The Company did not record an impairment charge relating to goodwill for the years ended December 31, 2018 and 2017.

Accrued Expenses

The Company's process of determining accrued expense for a financial period-end involves reviewing open contracts and purchase orders, communicating with personnel to identify services that have been performed for the Company and estimating the level of service performed and the associated cost incurred for the service when the Company has not yet been invoiced or otherwise notified of the actual cost. The majority of the Company's service providers invoice periodically in arrears for services performed or when contractual milestones are met. The Company estimates accrued expenses at a financial period-end based on facts and circumstances known at that time and may periodically confirm the accuracy of estimates with its service providers and make adjustments if necessary.

Contingent Consideration

Contingent consideration arising from a business combination is included as part of the purchase price and is recognized at fair value as of the acquisition date. Subsequent to the acquisition date, the Company measures contingent consideration arrangements at fair value for each period until the contingency is resolved. These changes in fair value are recognized in the consolidated statements of operations. Changes in fair values reflect new information about the likelihood of the payment of the contingent consideration and the passage of time.

Leases

The Company leases its facilities under non-cancelable operating leases that expire at various dates through 2024. The leases contain rent escalation and rent holiday, which are being accounted for as rent expense under the straight-line method. Deferred rent is included in accounts payable and other accrued expenses in the consolidated balance sheet. During 2016, the Company recorded a lease incentive obligation on the consolidated balance sheets representing a landlord incentive to reimburse the Company up to $0.2 million for construction on additional lease space in accordance with the Company's executed amended lease agreement at its Boston office location. These amounts are treated as reduction to rent expense over the lease term.

Revenue Recognition

Effective January 1, 2018, the Company adopted ASC Topic 606, *Revenue from Contracts with Customers*, or ASC 606, using the full retrospective transition method. Under this method, the Company revised its consolidated financial statements for the years ended December 31, 2017 and applicable interim periods within those years, as if ASC 606 had been effective for those periods. This standard applies to all contracts with customers, except for contracts that are within the scope of other standards, such as leases, insurance, and financial instruments. Under ASC 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration that the entity expects to receive in exchange for those goods or services. To determine revenue recognition for arrangements that an entity determines are within the scope of ASC 606, the entity performs the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the entity satisfies a performance obligation. The Company only applies the five-step model to contracts when it is probable that the entity will collect the consideration it is entitled to in exchange for the goods or services it transfers to the customer. At contract inception, once the contract is determined to be within the scope of ASC 606, the Company assesses the goods or services promised within each contract and determines those that are performance obligations and assesses whether each promised good or service is distinct. The Company then recognizes as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied as services are rendered.

The Company enters into collaboration agreements for research, development, manufacturing and commercial services that are within the scope of ASC 606, under which it licenses certain rights to its product candidates to third parties. The terms of these arrangements typically include payment to the Company of one or more of the following: non-refundable, upfront license fees; reimbursement of certain costs; customer option exercise fees; development, regulatory and commercial milestone payments; and royalties on net sales of licensed products. The amount of variable consideration is constrained until it is probable that the revenue is not at a significant risk of reversal in a future period. The contracts into which the Company enters generally do not include significant financing components.

As part of the accounting for these arrangements, the Company must use significant judgment to determine: (a) the transaction price under step (iii) above and (b) the timing of revenue recognition, including the appropriate measure of progress, in step (v) above. The Company uses judgment to determine whether milestones or other variable consideration, except for royalties, should be included in the transaction price, as described further below. The transaction price is allocated to each performance obligation on a relative stand-alone selling price basis, for which the Company recognizes revenue as or when the performance obligations under the contract are satisfied. If a milestone or other variable consideration relates specifically to the Company's efforts to satisfy a single performance obligation or to a specific outcome from satisfying the performance obligation, the Company generally allocates the milestone amount entirely to that performance obligation once it is probable that a significant revenue reversal would not occur.

Amounts received prior to revenue recognition are recorded as deferred revenue. Amounts expected to be recognized as revenue within the 12 months following the balance sheet date are classified as current portion of deferred revenue in the accompanying consolidated balance sheets. Amounts not expected to be recognized as revenue within the 12 months following the balance sheet date are classified as deferred revenue, net of current portion.

Licenses of intellectual property

In assessing whether a license is distinct from the other promises, the Company considers factors such as the research, development, manufacturing and commercialization capabilities of the collaboration partner and the availability of the associated expertise in the general marketplace. In addition, the Company considers whether the collaboration partner can benefit from a license for its intended purpose without the receipt of the remaining promise(s), whether the value of the license is dependent on the unsatisfied promise(s), whether there are other vendors that could provide the remaining promise(s), and whether it is separately identifiable from the remaining promise(s). For licenses that are combined with other promises, the Company utilizes judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing revenue. The Company evaluates the measure of progress each reporting period and, if necessary, adjusts the measure of performance and related revenue recognition.

Customer options

If an arrangement is determined to contain customer options that allow the customer to acquire additional goods or services, the goods and services underlying the customer options are not considered to be performance obligations at the outset of the arrangement, as they are contingent upon option exercise. The Company evaluates the customer options for material rights, or options to acquire additional goods or services for free or at a discount. If the customer options are determined to represent or include a material right, the material right is recognized as a separate performance obligation at the outset of the arrangement. The Company allocates the transaction price to material rights based on the relative standalone selling price, which is determined based on the identified discount and the probability that the customer will exercise. Amounts allocated to a material right are not recognized as revenue until, at the earliest, the option is exercised.

Milestone payments

At the inception of each arrangement that includes milestone payments, the Company evaluates whether the milestones are considered probable of being achieved and estimates the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant reversal of cumulative revenue would not occur, the associated milestone value is included in the transaction price. Milestone payments that are not within the control of the Company or the licensee, such as regulatory approvals, are not considered probable of being achieved until those approvals are received. The Company evaluates factors such as the scientific, clinical, regulatory, commercial, and other risks that must be overcome to achieve the particular milestone in making this assessment. There is considerable judgment involved in determining whether it is probable that a significant reversal of cumulative revenue would not occur. At the end of each subsequent reporting period, the Company reevaluates the probability of achievement of all milestones subject to constraint and, if necessary, adjusts its estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect revenues and earnings in the period of adjustment.

Royalties

For arrangements that include sales-based royalties, including milestone payments based on a level of sales, and the license is deemed to be the predominant item to which the royalties relate, the Company recognizes revenue at the later of (i) when the related sales occur, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied (or partially satisfied).

Contract costs

The Company recognizes as an asset the incremental costs of obtaining a contract with a customer if the costs are expected to be recovered. As a practical expedient, the Company recognizes the incremental costs of obtaining a contract as an expense when incurred if the amortization period of the asset that the Company otherwise would have recognized is one year or less. To date, the Company has not incurred any incremental costs of obtaining a contract with a customer.

Impact of adoption

The adoption of ASC 606 on January 1, 2018 did not result in significant changes to the revenue recognition pattern for any of the Company's license and collaboration agreements. For further discussion of the adoption of this standard, and for a discussion of accounting for collaboration revenue, see Note 4, *License and Collaboration Agreements*.

Research and Development Expenses

Research and development expenses are charged to expense as incurred. Research and development expenses consist of the costs incurred in performing research and development activities, including personnel-related costs, stock-based compensation, facilities, research-related overhead, clinical trial costs, contracted services, manufacturing, license fees and other external costs. The Company accounts for nonrefundable advance payments for goods and services that will be used in future research and development activities as expenses when the service has been performed or when the goods have been received rather than when the payment is made.

Income Taxes

The Company accounts for income taxes under the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been included in the financial statements. Under this method, the Company determines deferred tax assets and liabilities on the basis of the differences between the financial statement and tax bases of assets and liabilities by using enacted tax rates in effect for the year in which the differences are expected to reverse. The effect of a change in tax rates on deferred tax assets and liabilities is recognized in income in the period that includes the enactment date.

The Company recognizes deferred tax assets to the extent that the Company believes that these assets are more likely than not to be realized. In making such a determination, the Company considers all available positive and negative evidence, including future reversals of existing taxable temporary differences, projected future taxable income, tax-planning strategies, and results of recent operations. If the Company determines that the Company would be able to realize our deferred tax assets in the future in excess of their net recorded amount, the Company would make an adjustment to the deferred tax asset valuation allowance, which would reduce the provision for income taxes.

The Company records uncertain tax positions in accordance with ASC 740, *Income Taxes*, or ASC 740 on the basis of a two-step process in which (1) the Company determines whether it is more likely than not that the tax positions will be sustained on the basis of the technical merits of the position and (2) for those tax positions that meet the more-likely-than-not recognition threshold, the Company recognizes the largest amount of tax benefit that is more than 50 percent likely to be realized upon ultimate settlement with the related tax authority.

The Company recognizes interest and penalties related to unrecognized tax benefits on the income tax expense line in the accompanying consolidated statement of operations. The Company has not recorded interest and penalties related to any unrecognized tax benefits in the years ended December 31, 2018 and 2017.

Stock-Based Compensation

The Company accounts for its stock-based awards in accordance with ASC 718, *Compensation—Stock Compensation*, or ASC 718, which requires all stock-based payments to employees, including grants of stock options, modifications to existing stock options, and restricted stock unit awards, to be recognized as expense based on their fair values. The Company recognizes the compensation cost of awards subject to performance-based vesting conditions over the requisite service period, to the extent achievement of the performance condition is deemed probable relative to targeted performance using the accelerated attribution method. If achievement of the performance condition is not probable, but the award will vest based on the service condition, the Company recognizes the expense over the requisite service period. A change in the requisite service period that does not change the estimate of the total compensation cost (i.e., it does not affect the grant-date fair value or quantity of awards to be recognized) is recognized prospectively over the remaining requisite service period. A change in the estimate of the quantity of the awards that are considered probable of vesting results in a cumulative catch-up of stock-based compensation expense in the period of the change in estimate. The Company accounts for stock-based awards to non-employees using the fair value method on a straight-line basis over the associated service period of the award. The Company expenses restricted stock unit awards to employees based on the fair value of the award on a straight-line basis over the associated service period of the award.

Share-based payments issued to non-employees are recorded at their fair values, are periodically revalued as the equity instruments vest and are recognized as expense over the related service period in accordance with the provisions of ASC 718 and ASC Topic 505 (ASC 505), *Equity*.

The Company estimates the fair value of its stock-based awards to employees and non-employees using the Black-Scholes option pricing model, which requires the input of highly subjective assumptions, including (1) the expected volatility of stock, (2) the expected term of the award, (3) the risk-free interest rate and (4) expected dividends. Due to the lack of a public market for the Company's common stock prior to completion of reverse merger on October 30, 2014, and resulting lack of company-specific historical and implied volatility data, the Company has based its estimate of expected volatility on the historical volatility of a group of similar companies that are publicly traded. For these analyses, the Company has selected companies with characteristics that are comparable, including enterprise value, risk profiles, position within the industry, and with historical share price information sufficient to meet the expected life of the stock-based awards. The Company computes the historical volatility data using the daily closing prices for the selected companies' shares during the equivalent period as the calculated expected term of its stock-based awards. During 2015, the Company began to blend its stock price history, for the length of time it has market data for its stock, with the historical volatility of similar public companies for the expected term of each grant. The Company has estimated the expected life of its employee stock options as the average of the midpoints between vesting exercise date for each vesting-tranche and the contractual term of the options as the last available exercise date of the option. The risk-free interest rates for periods within the expected life of the option are based on the U.S. Treasury yield curve in effect during the period the options were granted.

Comprehensive Income (Loss)

Comprehensive income (Loss) is defined as the change in non-owner sources of equity of a business enterprise during a period from transactions, other events and circumstances and currently consists of net loss and changes in unrealized gains and losses on available-for-sale securities.

Segment and Geographic Information

Operating segments are defined as components of an enterprise engaging in business activities for which discrete financial information is available and regularly reviewed by the chief operating decision maker in deciding how to allocate resources and in assessing performance. The Company views its operations and manages its business in one operating segment, and the Company operates in only one geographic segment.

Subsequent Events

The Company considers events or transactions that occur after the balance sheet date, but prior to the issuance of the financial statements to provide additional evidence relative to certain estimates or to identify matters that require additional disclosure. Refer to the Notes below for further details on subsequent events.

Recent Accounting Pronouncements

From time to time, new accounting pronouncements are issued by the FASB or other standard setting bodies and adopted by the Company as of the specified effective date. Unless otherwise discussed, the Company believes that the impact of recently issued standards that are not yet effective will not have a material impact on its financial position or results of operations upon adoption.

In November 2018, the FASB issued ASU No. 2018-18, *Collaborative Arrangements (Topic 808): Clarifying the Interaction between Topic 808 and Topic 606,* which clarifies that certain transactions between participants in a collaborative arrangement should be accounted for under ASC 606 when the counterparty is a customer. In addition, ASU 2018-18 precludes an entity from presenting consideration from a transaction in a collaborative arrangement as revenue from contracts with customers if the counterparty is not a customer for that transaction. The Company adopted ASU 2018-18 during the three months ended December 31, 2018. The adoption of ASU 2018-18 did not have a material impact on the Company's financial position or results of operations.

In February 2016, the FASB issued ASU No. 2016-02, Leases (Topic 842). The amendment requires a lessee to recognize assets and liabilities for leases with a maximum possible term of more than 12 months. A lessee would recognize a liability to make lease payments (the lease liability) and a right-of-use asset representing its right to use the leased asset (the underlying asset) for the lease term. This ASU is effective for fiscal years and interim periods beginning after December 15, 2018. The guidance is required to be adopted using a modified retrospective approach applied to leases existing at the date of initial application. The new standard is effective for the Company on January 1, 2019, with early adoption permitted. An entity may choose to use either (1) its effective date or (2) the beginning of the earliest comparative period presented in the financial statements as its date of initial application. We expect to adopt the new standard on January 1, 2019 and use the effective date as our date of initial application. Consequently, financial

information will not be restated and the disclosures required under the new standard will not be provided for dates and periods prior to January 1, 2019. The new standard provides a number of optional practical expedients in transition. The Company expects it will elect to utilize the available package of practical expedients permitted under the transition guidance within the new standard, which does not require the reassessment of the following: (i) whether existing or expired arrangements are or contain a lease, (ii) the lease classification of existing or expired leases, and (iii) whether previous initial direct costs would qualify for capitalization under the new lease standard. Further, the Company expects to utilize the short-term lease exemption for all leases with a lease term of 12 months or less for purposes of applying the recognition and measurements requirements in the new standard. In preparation for the adoption of the standard, the Company has implemented internal controls and processes to enable the preparation of financial information including the assessment of the impact of the standard. The Company's analysis includes, but is not limited to, assessing its existing lease and service contracts, determining the appropriate discount rates to apply to its leases in order to determine the impact that the new leasing standards may have on its consolidated statements of operations, financial position and disclosures. Further, the Company is establishing policies and procedures in order to adhere to the requirements of the new standard, which includes enhanced disclosure requirements. While the Company continues to assess all of the impacts of the adoption of the new standard, the Company currently expect to recognize additional lease liabilities and right-of-use assets for its operating leases as of January 1, 2019 which will have a material impact to its consolidated balance sheets. Refer to Note 16, *Commitments and Contingencies*, for further detail regarding our operating leases. The Company does not expect that the new standard will have a material impact to the Company's consolidated statements of operations or cash flows.

In October 2016, the FASB issued ASU No. 2016-16, *Intra-Entity Transfers of Assets Other Than Inventory*, or ASU 2016-16. The amendments in ASU 2016-16 require an entity to recognize the income tax consequences of intra-entity transfers of assets other than inventory at the time that the transfer occurs. Current guidance does not require recognition of tax consequences until the asset is eventually sold to a third party. ASU 2016-16 is effective for fiscal years, and interim periods beginning after December 15, 2017. Early adoption is permitted as of the first interim period presented in a year. A reporting entity must apply the amendments in ASU 2016-16 using a modified retrospective approach by recording a cumulative-effect adjustment to equity as of the beginning of the fiscal year of adoption. The Company adopted this standard on January 1, 2018 and such adoption did not have a material impact on the Company's consolidated financial statements.

In January 2017, the FASB issued ASU No. 2017-04, *Simplifying the Test for Goodwill Impairment*, or ASU 2017-04. The amendments in ASU 2017-04 eliminate the current two-step approach used to test goodwill for impairment and require an entity to apply a one-step quantitative test and record the amount of goodwill impairment as the excess of a reporting unit's carrying amount over its fair value, not to exceed the total amount of goodwill allocated to the reporting unit. ASU 2017-04 is effective for fiscal years and interim periods beginning after December 15, 2019 (upon the first goodwill impairment test performed during that fiscal year). Early adoption is permitted for interim or annual goodwill impairment tests performed on testing dates after January 1, 2017. A reporting entity must apply the amendments in ASU 2017-04 using a prospective approach. The Company does not expect the adoption of ASU 2017-04 to have a material impact to its consolidated financial position or results of operations.

In May 2017, the FASB issued ASU 2017-09, *Compensation – Stock Compensation (Topic 718): Scope Modification Accounting*. The new standard is intended to reduce the diversity in practice and cost and complexity when applying the guidance in Topic 718 to a change to the terms or conditions of a share-based payment award. The new standard was effective beginning January 1, 2018. The adoption of this standard did not have a material impact on the Company's financial position or results of operations upon adoption.

In June 2018, the FASB issued ASU 2018-07, *Improvements to Nonemployee Share-Based Payment Accounting*. The new standard simplifies the accounting for share-based payments to non-employees by aligning it with the accounting for share-based payments to employees, with certain exceptions. The new standard became effective beginning January 1, 2019 and early adoption is permitted. The Company adopted the standard on January 1, 2019. The adoption of these standards is not expected to have a material impact on the Company's consolidated financial position or results of operations upon adoption.

3. Net Loss Per Share

Basic net loss per share is calculated by dividing the net loss by the weighted-average number of common shares outstanding during the period, without consideration for common stock equivalents. Diluted net loss per share is computed by dividing the net loss by the weighted-average number of common share equivalents outstanding for the period determined using the treasury-stock method or the as if converted method, as applicable. For purposes of this calculation, stock options, restricted stock units, or RSUs, warrants to purchase common stock and shares of common stock issuable upon conversion of convertible debt are considered to be common stock equivalents and are only included in the calculation of diluted net loss per share when their effect is dilutive.

The following table presents the computation of basic and diluted net loss per share.

	Year Ended December 31,	
	2018	2017
Numerator		
Net loss	$ (112,356)	$ (89,069)
Denominator		
Weighted-average common shares outstanding—basic and diluted	31,513,454	26,827,253
Net loss per share—basic and diluted	$ (3.57)	$ (3.32)

The following outstanding shares subject to stock options and RSUs, warrants to purchase shares of common stock and common stock issuable upon conversion of convertible debt were antidilutive due to a net loss in the periods presented and, therefore, were excluded from the dilutive securities computation for the years ended December 31, 2018 and 2017, as indicated below:

	Year Ended December 31,	
	2018	2017
Excluded potentially dilutive securities (1):		
Common stock issuable under the April 2018 convertible debt offering	10,377,361	—
Shares subject to options to purchase common stock	3,777,162	3,608,907
Unvested restricted stock units	1,470,237	1,167,703
Shares subject to warrants to purchase common stock	104,455	84,828
Shares issuable under employee stock purchase plan	979,833	36,539
Totals	16,709,048	4,897,977

(1) The number of shares is based on the maximum number of shares issuable on exercise or conversion of the related securities as of the year end. Such amounts have not been adjusted for the treasury stock method or weighted average outstanding calculations as required if the securities were dilutive.

4. License and Collaboration Agreements

On April 21, 2017, Paratek Bermuda Ltd., a wholly-owned subsidiary of Paratek Pharmaceuticals, Inc., and Zai entered into a License and Collaboration Agreement, or the Zai Collaboration Agreement. Under the terms of the Zai Collaboration Agreement, Paratek Bermuda Ltd. granted Zai an exclusive license to develop, manufacture and commercialize omadacycline, or the licensed product, in the People's Republic of China, Hong Kong, Macau and Taiwan, or the Zai territory, for all human therapeutic and preventative uses other than biodefense. Zai is responsible for the development, manufacturing and commercialization of the licensed product in the Zai territory, at its sole cost with certain assistance from Paratek Bermuda Ltd.

Under the terms of the Zai Collaboration Agreement, Paratek Bermuda Ltd. earned an upfront cash payment of $7.5 million in April 2017 and $5.0 million upon approval by the FDA of a New Drug Application, or NDA, submission in the CABP indication, which occurred on October 2, 2018. Paratek Bermuda Ltd. is eligible to receive up to $9.0 million in potential future regulatory milestone payments and $40.5 million in potential future commercial milestone payments, the next being $3.0 million upon submission of the first regulatory approval application for a licensed product in the People's Republic of China. The terms of the Zai Collaboration Agreement also provide for Zai to pay Paratek Bermuda Ltd. tiered royalties at a low double digit to mid-teen percent on net sales of the licensed product in the Zai territory.

The Zai Collaboration Agreement will continue, on a region-by-region basis, until the expiration of and payment by Zai of all Zai's payment obligations, which is until the later of: (i) the abandonment, expiry or final determination of invalidity of the last valid claim within the Paratek patents that covers the licensed product in the region in the Zai territory in the manner that Zai or its affiliates or sublicensees exploit the licensed product or intend for the licensed product to be exploited; or (ii) the eleventh anniversary of the first commercial sale of such licensed product in such region.

The Company evaluated the Zai Collaboration Agreement under ASC 606. The Company determined that there were six material promises under the Zai Collaboration Agreement: (i) an exclusive license to develop, manufacture and commercialize omadacycline in the Zai territory, (ii) the initial technology transfer (iii) a transfer of certain materials and materials know-how, (iv) optional manufacturing services, (v) optional regulatory support and (vi) optional commercialization support. The Company

determined that the exclusive license and initial technology transfer were not distinct from one another, as the license has limited value without the transfer of the Company's technology, which will allow Zai to develop the manufacturing process and commercialize omadacycline in the Zai territory in the timeline anticipated under the agreement. Without the technology transfer, Zai would incur additional costs to recreate the Company's know-how. Therefore, the license and initial technology transfer are combined as a single performance obligation. The transfer of materials is a single distinct performance obligation. The Company evaluated the option rights for manufacturing services, regulatory support and commercialization support to determine whether they represent or include material rights to Zai and concluded that the options were not issued at a discount, and therefore do not represent material rights. As such, they are not considered performance obligations at the outset of the arrangement.

Based on these assessments, the Company determined that two performance obligations existed at the outset of the Zai Collaboration Agreement: (i) the exclusive license combined with the initial technology transfer and (ii) the transfer of certain materials.

The Company determined that the upfront payment of $7.5 million constituted the entirety of the consideration to be included in the transaction price as of the outset of the Zai Collaboration Agreement. Future potential milestone payments were excluded from the transaction price as they are fully constrained as the risk of significant reversal has not yet been resolved. The achievement of the future potential milestones is not within the Company's control and is subject to certain research and development success or regulatory approvals and therefore carry significant uncertainty. The Company will reevaluate the likelihood of achieving future milestones at the end of each reporting period. As all performance obligations have been satisfied, if the risk of significant reversal is resolved, any future milestone revenue from the arrangement will be recognized as revenue in the period the risk is relieved.

The Company satisfied both performance obligations and recognized the upfront payment of $7.5 million as revenue in the year ended December 31, 2017.

As FDA approval was not within the control of the Company and was not obtained until October 2, 2018, the achievement of the milestone was not deemed probable and the risk of significant reversal of revenue was not resolved until that time. Upon the FDA approval, the uncertainty related to this milestone was resolved and a significant reversal of revenue would not occur in future periods. As such, the $5.0 million milestone payment was recognized as revenue at the time of FDA approval.

As regulatory approval in the PRC is not within the control of the Company, the achievement of the milestone was not deemed probable and the risk of significant reversal of revenue was not resolved as of December 31, 2018. As such, the next milestone payment was not recognized as revenue in the year ended December 31, 2018.

There was no deferred revenue as of December 31, 2018 and 2017.

Almirall, LLC

In July 2007, the Company and Warner Chilcott Company, Inc. (which became a part of Allergan plc, or Allergan), entered into a collaborative research and license agreement under which the Company granted Allergan an exclusive license to research, develop and commercialize tetracycline products for use in the United States for the treatment of acne and rosacea. In August 2018, Allergan assigned to Almirall, LLC, or Almirall, its rights under the collaboration agreement, or the Almirall Collaboration Agreement. Since Allergan did not exercise its development option with respect to the treatment of rosacea prior to initiation of a Phase 3 trial for the product, the license grant to Allergan, which was assigned to Almirall, converted to a non-exclusive license for the treatment of rosacea as of December 2014. Under the terms of the Almirall Collaboration Agreement, the Company and Almirall are responsible for, and are obligated to use, commercially reasonable efforts to conduct specified development activities for the treatment of acne and, if requested by Almirall, the Company may conduct certain additional development activities to the extent the Company determines in good faith that the Company has the necessary resources available for such activities. Almirall has agreed to reimburse the Company for its costs and expenses, including third-party costs, incurred in conducting any such development activities.

Under the terms of the Almirall Collaboration Agreement, Almirall is responsible for and is obligated to use commercially reasonable efforts to develop and commercialize tetracycline compounds that are specified in the agreement for the treatment of acne. The Company has agreed during the term of the Almirall Collaboration Agreement not to directly or indirectly develop or commercialize any tetracycline compounds in the United States. for the treatment of acne, and Almirall has agreed during the term of the Almirall Collaboration Agreement not to directly or indirectly develop or commercialize any tetracycline compound included as part of the agreement for any use other than as provided in the Almirall Collaboration Agreement.

The Almirall Collaboration Agreement contains two performance obligations: (i) an exclusive license to research, develop and commercialize tetracycline products for use in the United States for the treatment of acne and rosacea and (ii) research and development services. The performance obligation to deliver the license was satisfied upon execution of the Almirall Collaboration Agreement in July 2007. All research and development services were completed by December 2010. The options provided to Almirall for additional development services do not provide Almirall with a material right as these services will not be provided at a significant or incremental discount. As such, the option services are not performance obligations.

The Company received an upfront fee in the amount of $4.0 million upon the execution of the Almirall Collaboration Agreement, $1.0 million upon filing of an Investigational NDA in 2010, $2.5 million upon initiation of Phase 2 trials in 2012 and $4.0 million upon initiation of Phase 3 trials associated with the Almirall Collaboration Agreement in December 2014.

In December 2017, the FDA's acceptance of the NDA for sarecycline was received, triggering a milestone payment of $5.0 million earned upon acceptance of an NDA for a product licensed under the Almirall Collaboration Agreement. As the performance obligation to deliver the license was satisfied in 2007 and research and development services completed by December 2010, all subsequent milestone payments are recognized as revenue when the risk of significant reversal is resolved, generally when the milestone event occurs. Therefore, the $5.0 million milestone payment was recognized in December 2017 and subsequently collected in the first quarter of 2018.

In October 2018, the FDA's regulatory approval of sarecycline, under the tradename SEYSARA, triggered the last milestone payment under the Almirall Collaboration Agreement of $12.0 million. Since FDA approval of SEYSARA was outside of the Company's control and not obtained until October 2, 2018, the achievement of the milestone was not deemed probable and the risk of significant reversal of revenue was not resolved until such time. Upon the FDA approval, the uncertainty related to this milestone was resolved and a significant reversal of revenue would not occur in future periods. As such, the $12.0 million milestone payment was recognized as revenue at the time of FDA approval.

Almirall is also obligated to pay the Company tiered royalties, ranging from the mid-single digits to the low double digits, based on net sales of tetracycline compounds developed under the Almirall Collaboration Agreement, with a standard royalty reduction post patent expiration for such product for the remainder of the royalty term. Almirall's obligation to pay the Company royalties for each tetracycline compound it commercializes under the Almirall Collaboration Agreement expires on the later of the expiration of the last to expire patent that covers the tetracycline compound in the United States and the date on which generic drugs that compete with the tetracycline compound reach a certain threshold market share in the United States.

Royalty payments will be recognized when the sales occur.

Purdue Pharma L.P.

In July 2009, the Company and Purdue Pharma L.P., or Purdue Pharma, entered into a collaboration agreement, or the Purdue Collaboration Agreement, which granted an exclusive license to Purdue Pharma to commercialize Intermezzo in the United States in exchange for a non-refundable license fee, certain milestone payments and tiered royalties on net sales of Intermezzo.

In December 2013, Purdue Pharma notified the Company that it intended to discontinue use of the Purdue Pharma sales force to actively market Intermezzo to healthcare professionals during the first quarter of 2014.

In October 2014, the Company announced that its Board of Directors had approved a special dividend of, among other things, the right to receive, on a pro rata basis, 100% of any royalty income received by the Company pursuant to the Purdue Collaboration Agreement and 90% of any cash proceeds from a sale or disposition of Intermezzo, less fees and expenses incurred in connection with such activity, to the extent that either occurred prior to the second anniversary of the closing date of the Merger. On October 28, 2016, in satisfaction of the Company's payment obligation of the proceeds of sale or disposition of the Intermezzo assets to the former Transcept stockholders under the Merger Agreement, the Company executed a royalty sharing agreement, or the Royalty Sharing Agreement, with the Special Committee of the Company's Board of Directors, or the Special Committee, a committee established in connection with the Merger. Under the Royalty Sharing Agreement, the Company agreed to pay to the former Transcept stockholders 50% of all royalty income received by the Company pursuant to the Purdue Collaboration Agreement, net of all costs, fees and expenses incurred by the Company in connection with the Purdue Collaboration Agreement, related agreements, the Intermezzo product and the administration of the royalty income to the Transcept stockholders. The NDA for Intermezzo was then withdrawn from the FDA by Purdue Pharma as of December 31, 2018 and further sales of the drug are not planned. Neither the Company nor the former shareholders of Transcept will receive future cash payments pursuant to the Royalty Sharing Agreement. As such, the Company impaired the remaining balance of the Intermezzo product rights during the fourth quarter of 2018.

Tufts University

In February 1997, the Company and Tufts University, or Tufts, entered into a license agreement under which the Company acquired an exclusive license to certain patent applications and other intellectual property of Tufts related to the drug resistance field to develop and commercialize products for the treatment or prevention of bacterial or microbial diseases or medical conditions in humans or animals or for agriculture. The Company subsequently entered into eleven amendments to that agreement, collectively the Tufts License Agreement, to include patent applications filed after the effective date of the original license agreement, to exclusively license additional technology from Tufts, to expand the field of the agreement to include disinfectant applications, and to change the royalty rate and percentage of sublicense income paid by the Company to Tufts under sublicense agreements with specified sublicensees. The Company is obligated under the Tufts License Agreement to provide Tufts with annual diligence reports and a business plan and to meet certain other diligence milestones. The Company has the right to grant sublicenses of the licensed rights to third parties, which will be subject to the prior approval of Tufts unless the proposed sublicensee meets a certain net worth or market capitalization threshold. The Company is primarily responsible for the preparation, filing, prosecution and maintenance of all patent applications and patents covering the intellectual property licensed under the Tufts License Agreement at its sole expense. The Company has the first right, but not the obligation, to enforce the licensed intellectual property against infringement by third parties.

The Company issued Tufts 1,024 shares of the Company's common stock on the date of execution of the original license agreement, and the Company was required to make certain payments of up to $0.3 million to Tufts upon the achievement by products developed under the agreement of specified development and regulatory approval milestones. The Company made a payment of $50,000 to Tufts for achieving the first milestone following commencement of the Phase 3 clinical trial for omadacycline and a payment of $100,000 to Tufts for achieving the second milestone following its first marketing application submitted in the United States. The third, and final, payment of $150,000 became due upon FDA approval of omadacycline in October 2018. The Company is also obligated to pay Tufts a minimum royalty payment in the amount of $25,000 per year. In addition, the Company is obligated to pay Tufts royalties based on gross sales of products, as defined in the agreement, ranging in the low single digits depending on the applicable field of use for such product sale. If the Company enters into a sublicense under the agreement, based on the applicable field of use for such product, the Company will be obligated to pay Tufts (i) a percentage, ranging from 10% to 14% (ten percent to fourteen percent) for compounds other than omadacycline, and a percentage in the single digits for the compound omadacycline, of that portion of any sublicense issue fees or maintenance fees received by the Company that are reasonably attributable to the sublicense of the rights granted to the Company under the Tufts License Agreement and (ii) the lesser of (a) a percentage, ranging from the low tens to the high twenties based on the applicable field of use for such product, of the royalty payments made to the Company by the sublicensee or (b) the amount of royalty payments that would have been paid by the Company to Tufts if it had sold the product. The Company paid a sublicense issue fee to Tufts during the year ended December 31, 2017 upon earning the $7.5 million upfront payment under the Zai Collaboration Agreement.

Unless terminated earlier, the Tufts License Agreement will expire at the same time as the last-to-expire patent in the patent rights licensed to the Company under the agreement and after any such expiration the Company will continue to have an exclusive, fully-paid-up license to such intellectual property licensed from Tufts. Tufts has the right to terminate the agreement upon 30 days' notice should the Company fail to make a material payment under the Tufts License Agreement or commit a material breach of the agreement and not cure such failure or breach within such 30-day period, or if, after the Company has started to commercialize a product under the Tufts License Agreement, the Company ceases to carry on its business for a period of 90 consecutive days. The Company has the right to terminate the Tufts License Agreement at any time upon 180 days' notice. Tufts has the right to convert the Company's exclusive license to a non-exclusive license if the Company does not commercialize a product licensed under the agreement within a specified time period.

Past Collaborations

Novartis

In September 2009, the Company and Novartis International Pharmaceutical Ltd., or Novartis, entered into a Collaborative Development, Manufacture and Commercialization License Agreement, or the Novartis Agreement, which provided Novartis with a global, exclusive patent and technology license for the development, manufacturing and marketing of omadacycline. The Novartis Agreement was terminated by Novartis without cause in June 2011 and the termination was effective 60 days later. The Company and Novartis subsequently entered in a letter agreement in January 2012, or the Novartis Letter Agreement, as amended, pursuant to which we reconciled shared development costs and expenses and granted Novartis a right of first negotiation with respect to commercialization rights of omadacycline following approval of omadacycline from the FDA, EMA, or any regulatory agency, but only to the extent the Company had not previously granted such commercialization rights related to omadacycline to another third party as of any such approval. The Company also agreed to pay Novartis a 0.25% royalty, to be paid from net sales received by the Company in any country following the launch of omadacycline in that country and continuing until the later of expiration of the last active valid patent claim covering such product in the country of sale and 10 years from the date of first commercial sale in such country. The amended Novartis Letter Agreement resulted in a long-term liability in the amount of $3.6 million as of December 31, 2018 and December 31, 2017 included within "Other Long-Term Liabilities" on the Company's consolidated balance sheet. There are no other payment obligations to Novartis under the Novartis Agreement or the amended Novartis Letter Agreement.

5. Restricted Cash

Short-term restricted cash

As of December 31, 2018 and 2017, restricted cash of $0.3 million primarily represents royalty income received but not yet paid to former Transcept stockholders as part of the royalty sharing agreement, or the Royalty Sharing Agreement, executed by the Company on October 28, 2016 with the Special Committee. See Note 12, *Fair Value Measurements*, for more information on the Royalty Sharing Agreement.

Long-term restricted cash

The Company leases its Boston, Massachusetts office space under a non-cancelable operating lease. Refer to Note 16, *Commitments and Contingencies*, for further details. In accordance with the lease, the Company has a cash-collateralized irrevocable standby letter of credit in the amount of $0.3 million as of December 31, 2018 and 2017, naming the landlord as beneficiary.

6. Cash and Cash Equivalents and Marketable Securities

The following is a summary of available-for-sale securities as of December 31, 2018 (in thousands):

	Amortized Cost	Unrealized Gains	Unrealized Losses	Fair Value
December 31, 2018				
U.S. treasury securities	$ 245,979	$ 65	$ (193)	$ 245,851
Total	$ 245,979	$ 65	$ (193)	$ 245,851
December 31, 2017				
U.S. treasury securities	$ 114,666	$ —	$ (158)	$ 114,508
Government agencies	1,799	—	—	1,799
Total	$ 116,465	$	$ (158)	$ 116,307

No available-for-sale securities held as of December 31, 2018 and 2017 had remaining maturities greater than fifteen months and twelve months, respectively.

7. Fixed Assets, Net

Fixed assets consist of the following (in thousands):

	Estimated Useful Life In Years	December 31, 2018	December 31, 2017
Office equipment	5	$ 866	$ 866
Computer equipment	3	412	412
Computer software	3	798	787
Leasehold improvements		909	860
Gross fixed assets		2,985	2,925
Less: Accumulated depreciation and amortization		(1,812)	(1,214)
Net fixed assets		$ 1,173	$ 1,711

In addition, leasehold improvements are amortized over the shorter of the lease term or the estimated useful economic lives of the related assets.

Depreciation expense for both the years ended December 31, 2018 and 2017 was approximately $0.6 million, which is included in general and administrative and research and development expense on the accompanying consolidated statements of operations.

During 2017 the Company retired a small amount of fixed assets with no gain or loss recognized.

8. Intangible Assets, Net

Intermezzo product rights and the TO-2070 license rights were acquired through the Merger. Refer to Note 4, *License and Collaboration Agreements,* for further detail concerning Intermezzo. Intangible assets are reviewed when events or circumstances indicate that the assets might be impaired. An impairment loss would be recognized when the estimated undiscounted cash flows to be generated by those assets are less than the carrying amounts of those assets. If it is determined that the intangible asset is not recoverable, an impairment loss would be calculated based on the excess of the carrying value of the intangible asset over its fair value.

During the year ended December 31, 2017, Intermezzo product sales projections significantly declined and as such, a recoverability test was performed each reporting period during 2017. The Company determined that the summation of the undiscounted cash flows through the year of patent expiration, or the estimated useful life of the asset, were less than the carrying value of the asset resulting in total impairment of $0.7 million for the year ended December 31, 2017. During 2018, the NDA for Intermezzo was withdrawn from the FDA by Purdue Pharma and further sales of the drug are not planned. As such, the Company impaired the remaining balance of the Intermezzo product rights during 2018.

9. Accrued Expenses

Accrued expenses consist of the following (in thousands):

	December 31,	
	2018	2017
Intermezzo payable	$ —	$ 124
Accrued legal costs	366	257
Accrued other	809	262
Accrued professional fees	2,563	953
Accrued compensation	6,070	3,403
Accrued contract research	1,747	2,360
Accrued commercial	1,280	911
Total	$ 12,835	$ 8,270

10. Common Stock

Following the Merger, the authorized capital stock of the Company consists of 100,000,000 shares of common stock, par value $0.001 per share, and the preferred stock described in Note 11, *Preferred Stock*.

The holders of common stock are entitled to one vote per share on all matters to be voted upon by the stockholders and there are no cumulative rights. Subject to preferences that may be applicable to any outstanding preferred stock, the holders of common stock are entitled to receive ratably any dividends that may be declared from time to time by the board of directors out of funds legally available for that purpose. In the event of liquidation of the Company, dissolution or winding up, the holders of common stock are entitled to share ratably in all assets remaining after payment of liabilities, subject to prior distribution rights of preferred stock then outstanding. The common stock has no preemptive or conversion rights or other subscription rights. There are no redemption or sinking fund provisions applicable to the common stock. The outstanding shares of common stock are fully paid and non-assessable.

The Company completed an underwritten offering on May 5, 2015 of 3,089,000 shares of its common stock at a public offering price of $24.50 per share, which included 229,000 shares of its common stock issued upon the exercise, in part, by the underwriters of an option to purchase additional shares. The net proceeds received by the Company, after underwriting discounts and commissions and other offering expenses, were $70.4 million. The Company also completed an underwritten offering on June 27, 2016 of 4,887,500 shares of its common stock at a public offering price of $13.00 per share, which included 637,500 shares of its common stock issued upon the exercise, in full, by the underwriters of an option to purchase additional shares. The net proceeds received by the Company, after underwriting discounts and commissions and other estimated offering expenses, were $59.3 million.

In October 2015 and February 2017, the Company entered into Controlled Equity Offering℠ Sales Agreements, or the 2015 Sales Agreement and 2017 Sales Agreement, respectively, and collectively, the Sales Agreements, with Cantor Fitzgerald & Co., or Cantor, under which the Company could, at its discretion, from time to time sell shares of its common stock, with a sales value of up to $50 million under each Sales Agreement through Cantor. The Company provided Cantor with customary indemnification rights, and Cantor was entitled to a commission at a fixed rate of 3% of the gross proceeds per share sold. Sales of the shares under the Sales Agreements were to be made in transactions deemed to be “at the market offerings”, as defined in Rule 415 under the Securities Act of

1933, as amended. The Company has sold all $50 million of shares of its common stock under the 2015 Sales Agreement. The Company received $1.7 million in proceeds, after deducting commissions of $0.1 million, from the sale of 96,308 shares of common stock, during the year ended December 31, 2018, under the 2017 Sales Agreement. As of February 28, 2019, $0.8 million remains available for sale under the 2017 Sales Agreement.

The Company completed an underwritten offering on January 22, 2018 of 3,205,128 shares of its common stock. The total proceeds received by the Company were $50.0 million. Offering expenses incurred were approximately $0.2 million.

Warrants to Purchase Common Stock

Warrants to purchase preferred stock with intrinsic value issued to HBM Healthcare Investments (Cayman) Ltd., Omega Fund III, L.P., and K/S Danish BioVenture, all beneficial owners of more than 5% of the Company's common stock, were exchanged for 9,614 warrants to purchase common stock in connection with the Merger. 9,614 warrants to purchase common stock have an exercise price of $0.15 per share and will, if not exercised, expire in 2021. A further 5,120 warrants to purchase common stock with an exercise price of $73.66 per share expired in April 2016.

As described in Note 14, *Long-term Debt*, in connection with the second amendment to the Hercules Loan Agreement on December 12, 2016, the Company issued to each of Hercules Technology II, L.P. and Hercules Technology III, L.P. a warrant to purchase 18,574 shares of its common stock (37,148 shares of common stock in total) at an exercise price of $13.46 per share, or the Loan Amendment Warrants. Additionally, in connection with the borrowing of the Third Tranche, as defined in Note 14, *Long-term Debt*, on June 27, 2017, the Company issued an additional warrant to Hercules Capital, Inc. to purchase 5,374 shares of its common stock at an exercise price of $23.26 per share, or the Additional Warrant. The Additional Warrant's total relative fair value of $0.1 million was determined using a Black-Scholes option-pricing model with the following assumptions:

	June 30, 2017
Volatility	67.8%
Weighted average risk-free interest rate	1.8%
Expected dividend yield	0.0%
Expected term	5 years

As described in Note 14, *Long-term Debt*, in connection with the fifth amendment to the Hercules Loan Agreement, or the Fifth Amendment, on August 1, 2018, the Company issued to Hercules Capital, Inc. a warrant to purchase up to 19,627 shares of its common stock at an exercise price of $10.19 per share, or the Fifth Amendment Warrant. The Fifth Amendment Warrant's total relative fair value of $0.1 million was determined using a Black-Scholes option-pricing model with the following assumptions:

	August 1, 2018
Volatility	70.0%
Weighted average risk-free interest rate	2.9%
Expected dividend yield	0.0%
Expected life of options (in years)	7.0

The Hercules Warrants, Loan Amendment Warrants, Additional Warrant and the Fifth Amendment Warrant, collectively referred to as the Warrants, may be exercised on a cashless basis. The Warrants are exercisable for a term beginning on the date of issuance and ending on the earlier to occur of five years (or seven years, in the case of the Fifth Amendment Warrant) from the date of issuance or the consummation of certain acquisitions of the Company as set forth in the various agreements for the Warrants.

11. Preferred Stock

Following the Merger, the authorized capital stock of the Company consists of 5,000,000 shares of undesignated preferred stock, par value $0.001 per share, and the common stock described in Note 10, *Common Stock*. There are no shares of preferred stock outstanding.

The Company's Board of Directors has the authority, without further action by the stockholders, to issue up to 5,000,000 shares of preferred stock, in one or more series, and to fix the rights, preferences, privileges and restrictions granted to or imposed upon the preferred stock. Any or all of these rights may be greater than the rights of the common stock.

As a result of the Merger and concurrent recapitalization, there are no shares of preferred stock issued or outstanding as of December 31, 2018 and 2017.

12. Fair Value Measurements

Financial instruments, including cash, cash equivalents, restricted cash, money market funds, U.S. treasury and government agency securities, accounts receivable, accounts payable, accrued expenses, contingent obligations and the Intermezzo reserve, are carried on the condensed consolidated financial statements at amounts that approximate fair value. The fair value of the Company's long-term debt is determined using current applicable rates for similar instruments as of the balance sheet date. The fair value of the Company's debt (including the Notes as defined in Note 14, *Long-Term Debt)*, is $179.3 million as of December 31, 2018. The fair value of the Company's debt was determined using Level 3 inputs. Fair values are based on assumptions concerning the amount and timing of estimated future cash flows and assumed discount rates, reflecting varying degrees of perceived risk.

The following tables present information about the Company's financial assets and liabilities that have been measured at fair value as of December 31, 2018 and December 31, 2017, and indicate the fair value hierarchy of the valuation inputs utilized to determine such fair value. In general, fair values determined by Level 1 inputs utilize quoted prices (unadjusted) in active markets for identical assets or liabilities. Fair values determined by Level 2 inputs utilize observable inputs other than Level 1 prices, such as quoted prices for similar assets or liabilities or other inputs that are observable market data. Fair values determined by Level 3 inputs utilize unobservable data points for the asset or liability, and include situations where there is little, if any, market activity for the asset or liability (in thousands):

Description	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	December 31, 2018
Assets:				
U.S. treasury securities	$ 245,851	$ —	$ —	$ 245,851
Total Assets	$ 245,851	$ —	$ —	$ 245,851

Description	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	December 31, 2017
Assets:				
U.S. treasury securities	$ 114,508	$ —	$ —	$ 114,508
Government agencies	—	1,799	—	1,799
Total Assets	$ 114,508	$ 1,799	$ —	$ 116,307
Liabilities:				
Contingent obligations	$ —	$ —	$ 71	$ 71
Total Liabilities	$ —	$ —	$ 71	$ 71

Marketable Securities

U.S. treasury securities fair values can be obtained through quoted market prices in active exchange markets and are therefore classified as Level 1. The pricing on government agency securities was primarily sourced from independent third party pricing services, overseen by management, and is based on valuation models that consider standard input factor such as deal quotes, market spreads, cash flows, the U.S. Treasury yield curve, live trading levels, trade execution data, market consensus prepayment spreads, credit information and the bond's terms and conditions, among other things, and are therefore classified as Level 2.

Contingent Consideration

On October 28, 2016, in satisfaction of the Company's payment obligation of the proceeds of sale or disposition of the Intermezzo product rights to the former Transcept stockholders under the Merger Agreement, the Company executed the Royalty Sharing Agreement with the Special Committee. Under the Royalty Sharing Agreement, the Company agreed to pay to the former Transcept stockholders fifty percent of all royalty income received by the Company pursuant to the Purdue Collaboration Agreement, net of all costs, fees and expenses incurred by the Company in connection with the Purdue Collaboration Agreement, related agreements, the Intermezzo product and the administration of the royalty income to the former Transcept stockholders.

The significant unobservable inputs used in the fair value measurement of the contingent obligation to former Transcept stockholders with respect to the Intermezzo product rights during the year ended December 31, 2017 were estimated future Intermezzo product revenues and associated royalties due to the Company as well as the appropriate discount rate given consideration to the market and forecast risk involved. As of December 31, 2018, the NDA for Intermezzo was withdrawn from the FDA by Purdue Pharma and further sales of the drug are not planned. Neither Paratek nor the former shareholders of Transcept will receive future cash payments pursuant to the Royalty Sharing Agreement. As such, the Company wrote off the remaining balance of the Intermezzo product rights and related contingent consideration during the fourth quarter of 2018.

The results of the above yielded a decrease in the contingent obligation to former Transcept stockholders of $0.1 and $0.6 million during the years ended December 31, 2018 and 2017, respectively.

The following table provides a roll forward of the fair value of contingent obligations categorized as Level 3 instruments for the years ended December 31, 2018 and 2017 (in thousands):

	Contingent liability—former Transcept stockholders
Balances at December 31, 2016	$ 655
Decrease in fair value	(584)
Balances at December 31, 2017	$ 71
Decrease in fair value	(71)
Balances at December 31, 2018	$ —

13. Stock-Based Compensation

Certain employees, officers, directors and consultants have been granted options and other equity instruments to purchase common shares under plans adopted in 1996, 2001, 2002, 2005, 2006, 2014 and 2015, or the 1996 Plan, the 2001 Plan, the 2002 Plan, the 2005 Plan, the 2006 Plan, the 2014 Plan, the 2015 Plan, respectively, the 2015 Inducement Plan and the 2017 Inducement Plan. The 2001 Plan, 2002 Plan, and 2006 Plan were former Transcept plans that carried forward to the date of the Merger. The 1996 Plan, 2001 Plan, 2002 Plan, and 2005 Plan were cancelled at the effective time of the Merger. The 2006 Plan and 2014 Plan survived the Merger. Upon effectiveness of the 2015 Plan no further awards will be granted under the 2006 Plan and 2014 Plan.

Incentive stock and non-statutory stock options must be granted with exercise prices of not less than the fair market value of the common stock on the date of grant. Incentive stock options granted to a stockholder owning more than 10% of voting stock of the Company must have an exercise price of not less than 110% of the fair market value of the common stock on the date of grant. The Company determined the fair market value of common stock until the Company became publicly traded. Stock options are generally granted with terms of up to ten years and vest over a period of one to four years.

2006 Plan

The 2006 Plan provided for the grant of incentive stock options, non-statutory stock options, restricted stock, performance share awards, performance stock units, dividend equivalents, restricted stock units, stock payments, deferred stock, performance-based awards and stock appreciation rights. The outstanding employee stock options generally vested over four years, are exercisable over a period not to exceed the contractual term of ten years from the date the stock options are issued and are granted at prices equal to the fair market value of the Company's common stock on the grant date. The 2006 Plan was most recently amended and restated effective as of the date of the Company's 2010 Annual Stockholders' Meeting. Unless earlier terminated, the 2006 Plan will terminate on June 2, 2020.

Stock option exercises and restricted stock units are settled with newly issued common stock from the 2006 Plan's previously authorized and available pool of shares. A total of 200,206 shares of common stock was authorized for issuance pursuant to the 2006 Plan at the time of its most recent amendment and restatement in 2010, plus the number of shares of the Company's common stock available for issuance under the 2001 Plan that were not subject to outstanding options, as of the effective date of such amendment and restatement of the 2006 Plan (including shares that are subject to stock options outstanding under the 2001 Plan that expired, were cancelled or otherwise terminated unexercised, or shares that otherwise would have reverted to the share reserve of the 2001 Plan following such effective date). The number of shares of common stock reserved for issuance under the 2006 Plan increased automatically on the first day of each fiscal year by a number of shares equal to the least of: (i) 5.0% of shares of the Company's common stock outstanding on such date; (ii) 125,000 shares; or (iii) a smaller number determined by the Company's Board of Directors. This provision resulted in an additional 125,000 shares, and 125,000 shares, and of the Company's common stock becoming available for issuance on January 1, 2015 and January 1, 2014.

As of December 31, 2018 and 2017, no additional shares remained available for issuance under the 2006 Plan. All shares cancelled or forfeited during the years ended December 31, 2018 and 2017 became available for grant under the 2015 Plan.

2014 Plan

The 2014 Plan provided for the grant of incentive and non-statutory stock options, stock appreciation rights, restricted stock awards, restricted stock unit awards and other stock awards to employees, officers, directors, and consultants of the Company. Under the 2014 Plan, 67,500 shares of common stock were initially approved for grant. 67,500 shares of fully-vested restricted common stock were granted pursuant to the 2014 Plan to current and former employees and directors of the Company in June 2014.

Also in June 2014, the Board of Directors approved an increase in the shares available for grant under the 2014 Plan to 875,531 shares from the 67,500 shares and granted the resulting 808,031 shares that became available for issuance under the 2014 Plan as options to purchase common stock to certain employees in June 2014. The common stock grants and stock option exercises from the 2014 Plan are settled with newly issued common stock from the 2014 Plan's previously authorized and available pool of shares.

Further, in February 2015 the Company's Board of Directors modified the vesting terms of eight grants made to four executives of the Company aggregating 483,114 stock options previously granted under the 2014 Plan from strictly time-based vesting to include certain performance-based vesting terms associated with completion of data lock in the Company's Phase 3 clinical trials of IV-to-oral omadacycline for the treatment of ABSSSI and CABP. The Company recognizes compensation cost for awards with performance conditions if and when it concludes that it is probable that the performance condition will be achieved over the requisite service period. The Phase 3 ABSSSI IV-to-oral study data lock occurred in June 2016. This resulted in the vesting of 212,516 stock options. The Phase 3 CABP IV-to-oral study data lock occurred in March 2017. This resulted in the vesting of 212,516 stock options. The sum of the incremental compensation cost and any remaining unrecognized compensation cost for the original award on the modification date was recognized, on a prospective basis, through the performance achievement dates.

During the year ended December 31, 2015, prior to the effectiveness of the 2015 Plan, the Company's Board of Directors granted 24,000 stock options to directors, officers, employees and consultants to the 2014 Plan with time vesting provisions ranging from one to four years. As of December 31, 2018 and 2017, no additional shares remained available for issuance the 2014 Plan. All shares cancelled or forfeited during the years ended December 31, 2018 and 2017 became available for grant under the 2015 Plan.

2015 Plans

The Company's Board of Directors adopted a 2015 Inducement Plan in accordance with Nasdaq Rule 5635(c)(4), reserving 360,000 shares of common stock solely for the grant of inducement stock options to new employees, and granting 353,500 stock options under the plan to executives and employees of the Company under the 2015 Inducement Plan with time vesting provisions ranging from one to four years.

The Company has not made any additional grants under the 2015 Inducement Plan since December 31, 2015. Although the Company does not currently anticipate the issuance of additional stock options under the 2015 Inducement Plan, 106,500 shares remain available for grant under that plan, as well as any shares underlying outstanding stock options that may become available for grant pursuant to the plan's terms. It is therefore possible that the Company may, based on the business and recruiting needs of the Company, issue additional stock options under the 2015 Inducement Plan.

The Company's Board of Directors also adopted the 2015 Plan, which was approved by Company stockholders at the Annual Meeting held on June 9, 2015, reserving 1,200,000 shares of common stock for the grant of incentive stock options, non-statutory stock options, stock appreciation rights, restricted stock awards, restricted stock unit awards, performance stock awards, performance cash awards and other stock awards to directors, officers, employees and consultants. The 2015 Plan is intended to be the successor to and continuation of the 2006 Plan and the 2014 Plan, or collectively, the Prior Plans. When the 2015 Plan became effective, no additional stock awards were granted under the Prior Plans, although all outstanding stock awards granted under the Prior Plans will continue to be subject to the terms and conditions as set forth in the agreements evidencing such stock awards and the terms of the Prior Plans.

The number of shares available for issuance under the 2015 Plan was initially 1,200,000 shares, plus the number of shares that again become available for grant as a result of forfeited or terminated awards or shares withheld in satisfaction of the exercise price of withholding obligations associated with awards under the Prior Plans, not to exceed 2,000,000 shares. 1,612,969, 1,397,050 and 1,167,931 shares of common stock were automatically added to the shares authorized for issuance under the 2015 Plan on January 1, 2019, January 1, 2018 and January 1, 2017, respectively, pursuant to a "Share Reserve" provision contained in the 2015 Plan. The

Share Reserve will automatically increase on January 1st of each year, for the period commencing on (and including) January 1, 2016 and ending on (and including) January 1, 2025, in an amount equal to 5% of the total number of shares of common stock outstanding on December 31st of the preceding calendar year. Notwithstanding the foregoing, the Board of Directors of the Company may act prior to January 1st of a given year to provide that there will be no January 1st increase in the Share Reserve for such year or that the increase in the Share Reserve for such year will be a lesser number of shares of common stock than would otherwise occur.

During the year ended December 31, 2017, the Company's Board of Directors granted restricted stock unit awards to executives and employees of the Company. Certain of the grants included performance-based RSU, or PRSU, awards to certain executives and employees of the Company. The PRSU awards issued in February 2017 have vested as follows: 20% of the PRSUs vested upon achievement of data lock for Study 16301 (oral only ABSSSI), which occurred in July 2017; 30% of the PRSUs vested upon achievement of IV and oral NDA filing acceptances, which occurred in April 2018; and 50% of the PRSUs vested upon FDA approval of omadacycline, which occurred in October 2018. 400,500 shares vested during the year ended December 31, 2018 related to the February 2017 PRSU award resulting in compensation cost of $4.2 million.

The PRSU awards issued in August 2017 and January 4, 2018 were earned upon FDA approval of omadacycline, or the Milestone, and shall, upon achievement of the Milestone, which occurred in October 2018, be eligible to vest as to 100% of the PRSUs subject to the award on the first anniversary of the Milestone achievement date. No shares vested under the August 2017 or January 4, 2018 PRSU awards during the year ended December 31, 2018. Since the Milestone was achieved, the Company recognized compensation cost, for a total of $4.0 million for the performance condition during the year ended December 31, 2018 using the accelerated attribution method.

During the year ended December 31, 2018, the Company's Board of Directors granted 1,191,808 restricted stock unit, or RSU, awards to executives and employees of the Company and 141,175 stock options to directors, officers, employees and consultants of the Company under the 2015 Plan. The stock option awards are subject to time-based vesting over a period of one to four years. The RSU awards made to directors of the Company are subject to time-based vesting, with 1/3 of the award vesting on December 10, 2018, or the Initial Vesting Date, and an additional 1/3 vesting on each anniversary of the Initial Vesting Date. The grants also included PRSU awards to certain executives and employees of the Company and have vested or will vest as follows: (a)10/55 shall be earned and time vest on achievement of European Medicines Agency, or EMA, filing preliminary validation, which occurred in October 2018, (b) 20/55 shall be earned and time vest on achievement of EMA approval, and (c) 25/55 shall be earned on achievement of the launch of omadacycline in the United States and time vest on the date that is 15 months following such launch date. 86,750 shares vested during the year ended December 31, 2018 related to milestone (a) above, resulting in compensation cost of $1.2 million. Since the Company believes it is probable that milestone (c) above will be achieved, the Company recognized compensation cost, for a total of $1.2 million for the performance condition during the year ended December 31, 2018 using the accelerated attribution method.

7,500 RSUs and 41,832 stock options granted under the 2015 Plan were cancelled, forfeited or expired during the year ended December 31, 2018.

2017 Inducement Plan

In June 2017, the Company's Board of Directors adopted the 2017 Inducement Plan in accordance with Nasdaq Rule 5635(c)(4), reserving 550,000 shares of common stock solely for the grant of inducement stock options to employees entering into employment or returning to employment after a bona fide period of non-employment with the Company. In October 2018, the Company's Board of Directors adopted an amendment in accordance with Nasdaq Listing Rule 5635(c)(4) to increase the aggregate number of shares of common stock that may be issued pursuant to awards under the 2017 Inducement Plan from 550,000 shares to 1,050,000 shares.

During the year ended December 31, 2018, the Company's Board of Directors granted 175,100 stock options and 82,150 RSUs to employees of the Company under the 2017 Inducement Plan. The stock option awards are subject to time-based vesting over a period of one to four years. The RSU awards are time-based with 100% of the shares of common stock subject to the RSUs vesting three years from the grant date. 950 RSUs and 5,250 stock options granted under the 2017 Inducement Plan were forfeited during the year ended December 31, 2018.

Total shares available for future issuance under the 2015 Plan, 2015 Inducement Plan and 2017 Inducement Plan are 141,280, 106,500 shares and 538,950 shares, respectively, as of December 31, 2018.

A summary of stock option activity and related information through December 31, 2018 follows:

	Number of Shares	Weighted Average Exercise Price	Weighted–Average Remaining Contractual Term (in Years)	Aggregate Intrinsic Value (in thousands)
Outstanding				
Balances at December 31, 2017	3,608,907	$ 17.01	7.78	$ 13,311
Granted	316,275	12.32		
Exercised	(53,938)	5.28		
Cancelled or forfeited	(27,624)	17.70		
Expired	(66,458)	24.35		
Balances at December 31, 2018	3,777,162	$ 16.65	7.10	$ 506
Exercisable				
December 31, 2018	2,903,496	$ 16.73	6.71	$ 502

The aggregate intrinsic value is calculated as the difference between the exercise price of the underlying options and the fair market value of the common stock for the options that were in the money at December 31, 2018 and 2017.

During the years ended December 31, 2018 and 2017, the Company granted stock options to purchase an aggregate of 316,275 shares and 969,000 shares of its common stock, under the equity plans described above, respectively, with weighted-average grant date fair values of options granted of $7.63 and $11.34 and respectively.

The total intrinsic value of stock options exercised was $0.4 million and $1.4 million for the years ended December 31, 2018 and 2017, respectively.

Restricted Stock Units

The following is a summary of restricted stock unit activity for the year ended December 31, 2018:

	Number of Shares	Weighted Average Grant Date Fair Value per Share
Unvested balance at December 31, 2016	454,000	$ 19.67
Granted	908,200	$ 16.98
Released	(183,797)	$ 14.60
Forfeited	(10,700)	$ 14.14
Unvested balance at December 31, 2017	1,167,703	$ 18.43

During the year ended December 31, 2018 the Company granted 1,273,958 restricted stock units with a weighted-average grant date fair value per share of $13.97. During the year ended December 31, 2017 the Company granted 908,200 restricted stock units with a weighted-average grant date fair value per share of $16.98.

Stock-Based Compensation Expense

For stock options issued to employees and members of the Board of Directors, the Company estimates the grant date fair value of each option using the Black-Scholes option-pricing model. The use of the Black-Scholes option-pricing model requires management to make assumptions with respect to the expected term of the option, the expected volatility of the common stock consistent with the expected life of the option, risk-free interest rates and expected dividend yields of the common stock.

The relevant data used to determine the value of the stock option grants is as follows:

	Year Ended December 31,	
	2018	2017
Volatility	67.3%	75.5%
Weighted average risk-free interest rate	2.7%	2.0%
Expected dividend yield	0.0%	0.0%
Expected life of options (in years)	5.9	5.8

The following table presents stock-based compensation expense included in the Company's consolidated statements of operations (in thousands):

	Year Ended December 31,	
	2018	2017
Research and development expense	$ 8,727	$ 5,513
General and administrative expense	16,759	11,389
Total stock-based compensation expense	$ 25,486	$ 16,902

Total unrecognized stock-based compensation expense for all stock-based awards was $20.2 million at December 31, 2018. This amount will be recognized over a weighted-average period of 1.74 years.

2009 Employee Stock Purchase Plan

On June 3, 2009, at the annual meeting of stockholders, the stockholders of the Company approved the 2009 Employee Stock Purchase Plan, or the 2009 ESPP. The Company's 2009 ESPP is designed to allow eligible employees of the Company to purchase shares of common stock through periodic payroll deductions and during specified offering periods under the plan. The price of common stock purchased under the 2009 ESPP is equal to 85% of the lower of the fair market value of the common stock on the commencement date of each offering period or the specified purchase date. As of December 31, 2018 and 2017, 36,539 shares were available for issuance under the 2009 ESPP. Since the Merger, the Company has not made the 2009 ESPP available to employees.

2018 Employee Stock Purchase Plan

The Company's Board of Directors adopted, and in June 2018 Company's stockholders approved, the Paratek Pharmaceuticals, Inc. 2018 Employee Stock Purchase Plan, or the 2018 ESPP. The 2018 ESPP was amended in October 2018 to change the commencement dates of the offering periods. The maximum aggregate number of shares of our common stock that may be purchased under the 2018 ESPP will be 943,294 shares, or the ESPP Share Pool, subject to adjustment as provided for in the 2018 ESPP. The ESPP Share Pool represented 3% of the total number of shares of our common stock outstanding as of March 31, 2018. The 2018 ESPP allows eligible employees to purchase shares during certain offering periods, which will be six -month periods commencing June 1 and ending November 30 and commencing December 1 and ending May 31 of each year. The first offering under the 2018 ESPP was December 1, 2018.

Reserved Shares

At December 31, 2018, the Company has reserved shares of common stock for future issuance as follows:

	Number of Shares
Equity plans:	
Subject to outstanding options and restricted shares	5,247,399
Available for future grants	786,730
Warrants	104,455
Employee stock purchase plans	979,833
Common stock issuable under the April 2018 convertible debt offering	10,377,361
Total	17,495,778

14. Long-Term Debt

Hercules Loan Agreement

On September 30, 2015, the Company entered into the Hercules Loan Agreement with Hercules and certain other lenders, and Hercules Technology Growth Capital, Inc. (as agent). Under the Hercules Loan Agreement, Hercules provided the Company with access to term loans with an aggregate principal amount of up to $40.0 million, or collectively, the Term Loan. The Company initially drew a principal amount of $20.0 million, which was funded on September 30, 2015. The remaining $20.0 million under the Hercules Loan Agreement was available to be drawn at the Company's option in minimum increments of $10.0 million through December 31, 2016, or the Draw Period. The Term Loan was repayable in monthly installments commencing on April 1, 2018 through maturity on September 1, 2020. The interest rate was equal to the greater of (i) 8.5%, or (ii) the sum of 8.5%, plus the "prime rate" as reported in The Wall Street Journal minus 5.75% per annum. An end of term charge equal to 4.5% of the issued principal balance of the Term Loan was payable at maturity, including in the event of any prepayment, and was being accrued as interest expense over the term of the loan using the effective interest method. Borrowings under the Hercules Loan Agreement were collateralized by substantially all of the assets of the Company.

Subject to certain terms, pursuant to the Hercules Loan Agreement, Hercules was also granted the right to participate in an amount of up to $2.0 million in subsequent sales and issuances of the Company's equity securities to one or more investors for cash for financing purposes in an offering that is broadly marketed to multiple investors and at the same terms as the other investors. On September 30, 2015, Hercules Technology Growth Capital, Inc. entered into a Stock Purchase Agreement with the Company to purchase 44,782 shares of common stock resulting in proceeds to the Company of approximately $1.0 million. The excess of proceeds received by the Company over the fair value of the common stock issued was allocated as a reduction of the fees paid to Hercules in conjunction with obtaining the initial $20.0 million draw of the Term Loan.

Debt issuance costs of $511,000 were ratably allocated to the initial $20.0 million draw and the remaining unfunded $20.0 million. Debt issuance costs related to the initial $20.0 million draw were presented on the consolidated balance sheet as a direct deduction from the related debt liability. Issuance costs related to the unfunded amount were capitalized as prepaid asset and were to be amortized ratably through the end of the Draw Period.

In connection with the Hercules Loan Agreement, the Company issued to each of Hercules Technology II, L.P. and Hercules Technology III, L.P., a warrant to purchase 16,346 shares of the Company's common stock (32,692 shares of common stock in total) at an exercise price of $24.47 per share. The Hercules Warrants' total relative fair value of $288,000 at September 30, 2015 was determined using a Black-Scholes option-pricing model. The relative fair value of the Hercules Warrants was included as a discount to the Term Loan and also as a component of additional paid-in capital. See Note 10, *Capital Stock*, for further description of the Hercules Warrants.

In addition to the Hercules Warrants, the Company paid fees to Hercules in conjunction with obtaining the Term Loan. The Hercules Warrants fair value and fees paid to Hercules, an aggregate of $572,000, were ratably allocated to the initial $20.0 million draw and the remaining unfunded $20.0 million. The $208,000 of costs allocated to the initial $20.0 million draw were recorded as a debt discount and are being amortized as additional interest expense over the term of the loan using the effective interest method. The $364,000 of costs allocated to the unfunded $20.0 million was recorded as prepaid expenses and were being amortized ratably through the end of the Draw Period. In the event the Company exercised its option to borrow additional funds, the remaining unamortized prepaid asset balance related would be reclassified and recorded as debt discount based upon a ratable allocation of the amount drawn compared to the remaining unfunded amount available to the Company and would amortize over the remaining life of the term loan using the effective interest method.

On December 12, 2016, the Company and Hercules entered into a second amendment to the Hercules Loan Agreement, or the Second Amendment, which extended the date on which the Company must begin making amortization payments under the Hercules Loan Agreement from April 1, 2018 to January 1, 2019, or the Amortization Date. Upon commencement of the Amortization Date, the Company will make amortization payments based upon an amortization schedule equal to thirty consecutive months, with the balance of outstanding loans due on the original maturity date of the Hercules Loan Agreement. The Second Amendment also increased the amount that the Company may borrow by $10.0 million, from up to $40.0 million to up to $50.0 million in multiple tranches. In connection with the Second Amendment the Company paid Hercules a $0.4 million amendment fee. In connection with the Second Amendment, the Company issued to each one of Hercules Technology II, L.P. and Hercules Technology III, L.P. a warrant to purchase 18,574 shares of its common stock (37,148 shares of common stock in total) at an exercise price of $13.46 per share.

Under the Second Amendment the end of term charge was equal to 4.5% of the issued principal balance of the Hercules Loan Agreement, and was payable at maturity, including in the event of any prepayment, and is being accrued as interest expense over the term of the loan using the effective interest method. Borrowings under the Hercules Loan Agreement are still collateralized by substantially all of the assets of the Company.

On June 27, 2017, the Company and Hercules entered into a third amendment to the Hercules Loan Agreement, or the Third Amendment. The Third Amendment increased the amount that the Company may borrow by $10.0 million, from up to $50.0 million to up to $60.0 million, in multiple tranches. The additional $10.0 million tranche, or the Fourth Tranche, was available at the Company's option through December 15, 2017. The Fourth Tranche shall bear interest and have the same maturity as all other loans outstanding under the Hercules Loan Agreement, as amended.

The Company borrowed the first tranche of $20.0 million upon the closing of the Hercules Loan Agreement on September 30, 2015, and the second tranche of $20.0 million on December 12, 2016, or collectively, the Initial Tranches. Concurrently with the closing of the Third Amendment, the Company borrowed a third tranche of $10.0 million, or the Third Tranche. The Third Amendment extended the date on which the Company is required to begin making monthly principal installments under the Hercules Loan Agreement from January 1, 2019 to January 1, 2020, subject to the Company's receipt of marketing approval for the Company's lead product candidate, omadacycline, or the Interest Only Period Extension Event, which was obtained on October 2, 2018. Beginning on January 1, 2020, the Company is obligated to make payments in equal monthly installments of principal and interest, with the balance of outstanding loans due on the original maturity date of the Hercules Loan Agreement. In connection with the Third Amendment, the Company paid Hercules a $0.1 million amendment fee.

The Third Amendment reduced the end of term charge due with respect to the Third Tranche from to 4.5% to 2.25% if the obligations under the Hercules Loan Agreement were repaid in full on or prior to September 30, 2017, following Hercules' election not to consent to a proposed third-party, non-equity financing arrangement (excluding any stock issuance). The end of term charge with respect to the Fourth Tranche is 2.25%.

In connection with the borrowing of the Third Tranche, on June 27, 2017, the Company issued an additional warrant to Hercules Capital, Inc. that is exercisable for an aggregate of 5,374 shares of common stock at an exercise price of $23.26 per share. The Additional Warrant may be exercised on a cashless basis. The Additional Warrant is exercisable for a term beginning on the date of issuance and ending on the earlier to occur of five years from the date of issuance or the consummation of certain acquisitions of the Company as set forth in the Additional Warrant.

In connection with the offering of the Notes, discussed below, on April 17, 2018, the Company entered into a fourth amendment to the Hercules Loan Agreement, or the Fourth Amendment. The Fourth Amendment increases the amount of permitted indebtedness to an amount not to exceed $2.0 million and permits the Company to issue convertible notes in an aggregate principal amount of not more than $172.5 million provided that such convertible notes meet certain stipulations.

On August 1, 2018, the Company and Hercules entered into the Fifth Amendment to the Hercules Loan Agreement. The Fifth Amendment increased the amount that the Company may borrow by $30.0 million, from up to $60.0 million to up to $90.0 million, in multiple tranches.

Concurrently with the closing of the Fifth Amendment, the Company borrowed a fifth tranche of $10.0 million, or the Fifth Tranche. Two additional tranches of up to $10.0 million each ($20.0 million total), or the Additional Tranches, may be available to the Company, subject to determination by Hercules, in its sole discretion, whether to provide such tranches. As such, there can be no assurance as to whether or not the Additional Tranches shall be funded. The Fifth Amendment extended the date on which the Company is required to begin making monthly principal installments on loans previously outstanding under the Hercules Loan Agreement, or the Prior Tranches, from January 1, 2019 to January 1, 2021, subject to the Company's receipt of marketing approval for the Company's lead product candidate, omadacycline, or the Interest Only Period Extension Event, which was obtained on October 2, 2018. Beginning on January 1, 2021 through the maturity date of September 1, 2021, the Company is obligated to make payments in equal monthly installments of principal and interest with respect to the Prior Tranches. In connection with the Fifth Amendment, the Company paid Hercules a $0.1 million amendment fee.

The Fifth Tranche is repayable in monthly installments commencing on September 1, 2020 (or March 1, 2021 or September 1, 2021, if certain revenue milestones are satisfied by the Company) through maturity on August 1, 2022. The interest rate with respect to the Fifth Tranche is a floating per annum rate equal to the greater of (i) 7.85%, or (ii) the sum of 7.85%, plus the "prime rate" as reported in The Wall Street Journal minus 5.75%. An end of term charge equal to 6.95% of the issued principal balance of the Fifth Tranche will be payable at maturity, including in the event of any prepayment, and will be accrued as interest expense over the term of the Fifth Tranche using the effective interest method.

The Fifth Amendment amended the prepayment charges applicable to all loans outstanding under the Hercules Loan Agreement, such that prepayment fees equaling 1% to 2.5% will apply to principal amounts prepaid prior to dates between September 1, 2020 and January 1, 2021, varying depending on the applicable tranche.

In connection with the borrowing of the Fifth Tranche, on August 1, 2018, the Company issued an additional warrant to Hercules Capital, Inc. that is exercisable for a minimum of up to 19,627 shares of common stock (and additional shares if the Additional Tranches are funded) at an exercise price of $10.19 per share. The Fifth Amendment Warrant may be exercised on a cashless basis. The Fifth Amendment Warrant is exercisable for a term beginning on the date of issuance and ending on the earlier to occur of seven years from the date of issuance or the consummation of certain acquisitions of the Company as set forth in the Fifth Amendment Warrant. The Fifth Amendment Warrant's total relative fair value of $0.1 million was determined using a Black-Scholes option-pricing model.

Upon an Event of Default, an additional 5.0% interest would be applied, and Hercules could, at its option, accelerate and demand payment of all or any part of the loan together with the prepayment and end of term charges. An Event of Default is defined in the Hercules Loan Agreement as (i) failure to make required payments; (ii) failure to adhere to financial, operating and reporting loan covenants; (iii) an event or development occurs that would be reasonably expected to have a material adverse effect; (iv) false representations in the Hercules Loan Agreement; (v) insolvency, as described in the Hercules Loan Agreement; (vi) levy or attachments on any of the Company's assets; and (vii) default of any other agreement or subordinated debt greater than $1.0 million. In the event of insolvency, this acceleration and declaration would be automatic. In addition, in connection with the Hercules Loan Agreement, the Company agreed to provide Hercules with a contingent security interest in the Company's bank accounts. The Company's control of its bank accounts is not adversely affected unless Hercules elects to obtain unilateral control of the Company's bank accounts by declaring that an Event of Default has occurred. The principal of the Term Loan, which is not due within 12 months of December 31, 2018 as a result of the Interest Only Period Extension Event, has been classified as long-term debt.

The modified terms under the Second Amendment, Third Amendment and Fifth Amendment were not considered substantially different as compared to the terms of the Hercules Loan Agreement immediately prior to the Second Amendment, Third Amendment and Fifth Amendment, pursuant to ASC 470-50, *Modification and Extinguishment*. As such, the Second Amendment, Third Amendment and Fifth Amendment were accounted for as a debt modification. The 0.1 million, $0.4 million and $0.1 million amendment fees paid to Hercules in connection with the Second Amendment, Third Amendment and Fifth Amendment, respectively, were recorded as debt discount and will be amortized as part of the effective yield. In addition, the unamortized discount on the original loan agreement will be amortized as an adjustment of interest expense over the remaining term of the modified debt using an updated effective interest rate. All costs incurred with third parties were expensed as incurred.

The following table summarizes the impact of the Hercules Loan Agreement, as amended, on the Company's consolidated balance sheets at December 31, 2018 and 2017 (in thousands):

	Year Ended December 31,	
	2018	2017
Gross proceeds	$ 70,000	$ 60,000
Unamortized debt discount costs	(606)	(814)
Carrying Value	$ 69,394	$ 59,186

Debt issuance costs are presented on the consolidated balance sheet as a direct deduction from the related debt liability rather than capitalized as an asset in accordance with ASU No. 2015-03, *Interest - Imputation of Interest (Subtopic 835-30): Simplifying the Presentation of Debt Issuance Costs*.

Future principal payments, which exclude the end of term charge, in connection with the Hercules Loan Agreement, as amended, as of December 31, 2018 are as follows (in thousands):

2019	$ —
2020	1,556
2021	64,924
2022	3,520
2023 and thereafter	—
Total	$ 70,000

Convertible Senior Subordinated Notes

On April 18, 2018, the Company entered into a Purchase Agreement, or the Purchase Agreement, with several initial purchasers, or the Initial Purchasers, for whom Merrill Lynch, Pierce, Fenner & Smith Incorporated and Leerink Partners LLC acted as representatives, relating to the sale of $135.0 million aggregate principal amount of 4.75% Convertible Senior Subordinated Notes due 2024, or the Notes, to the Initial Purchasers. The Company also granted the Initial Purchasers an option to purchase up to an additional $25.0 million aggregate principal amount of Notes, which was exercised in full on April 20, 2018.

The Purchase Agreement includes customary representations, warranties and covenants. Under the terms of the Purchase Agreement, the Company agreed to indemnify the Initial Purchasers against certain liabilities.

In addition, J. Wood Capital Advisors LLC, the Company's financial advisor, purchased $5.0 million aggregate principal amount of Notes in a separate, concurrent private placement on the same terms as other investors.

The Notes were issued by the Company on April 23, 2018, pursuant to an Indenture, dated as of such date, or the Indenture, between the Company and U.S. Bank National Association, as trustee, or the Trustee. The Notes bear cash interest at the annual rate of 4.75%, payable on November 1 and May 1 of each year, beginning on November 1, 2018, and mature on May 1, 2024 unless earlier repurchased, redeemed or converted. The Company will settle conversions of the Notes through delivery of shares of common stock of the Company, in accordance with the terms of the Indenture. The initial conversion rate for the Notes is 62.8931 shares of common stock (subject to adjustment as provided for in the Indenture) per $1,000 principal amount of the Notes, which is equal to an initial conversion price of approximately $15.90 per share, representing a conversion premium of approximately 20% above the closing price of the common stock of $13.25 per share on April 18, 2018.

Holders of the Notes may convert all or any portion of their Notes, in multiples of $1,000 principal amount, at their option at any time prior to the close of business on the second scheduled trading day immediately preceding the stated maturity date.

The Company may not redeem the Notes prior to May 6, 2021. The Company may redeem for cash all or part of the Notes, at its option, on or after May 6, 2021 if the last reported sale price of the Company's common stock has been at least 130% of the conversion price then in effect for at least 20 trading days (whether or not consecutive) during any 30 consecutive trading day period (including the last trading day of such period) ending on, and including, the trading day immediately preceding the date on which the Company provides notice of redemption at a redemption price equal to 100% of the principal amount of the Notes to be redeemed, plus accrued and unpaid interest to, but excluding, the redemption date.

If the Company experiences a fundamental change, as described in the Indenture, prior to the maturity date of the Notes, holders of the Notes will, subject to specified conditions, have the right, at their option, to require the Company to repurchase for cash all or a portion of their Notes at a repurchase price equal to 100% of the principal amount of the Notes to be repurchased, plus accrued and unpaid interest, if any, to, but not including, the fundamental change repurchase date. In addition, following certain corporate events that occur prior to the maturity date of the Notes and following a notice of redemption of the notes, the Company will increase the conversion rate for a holder who elects to convert its Notes in connection with such corporate event or redemption.

The Indenture provides for customary events of default. In the case of an event of default with respect to the Notes arising from specified events of bankruptcy or insolvency, all outstanding Notes will become due and payable immediately without further action or notice. If any other event of default with respect to the Notes under the Indenture occurs or is continuing, the Trustee or holders of at least 25% in aggregate principal amount of the then outstanding Notes may declare the principal amount of the Notes to be immediately due and payable.

In certain circumstances if, at any time during the six-month period beginning on, and including, the date that is six months after the last date of original issuance of the Notes, the Company fails to timely file certain documents or reports required under the Securities Exchange Act of 1934, as amended, or the Notes are not otherwise freely tradable by holders of the Notes other than the Company's affiliates or holders that were the Company's affiliates at any time during the three months immediately preceding, additional interest will accrue on the Notes during the first 90-day period in which its failure to file has occurred and is continuing or such Notes are not otherwise freely tradable by holders other than the Company's affiliates (or holders that were the Company's affiliates at any time during the three months immediately preceding).

In addition, if, and for so long as, the restrictive legend on the Notes has not been removed, the Notes are assigned a restricted CUSIP number or the Notes are not otherwise freely tradable by holders other than the Company's affiliates or holders that were our affiliates at any time during the three months immediately preceding (without restrictions pursuant to U.S. securities laws or the terms of the Indenture or the Notes) as of the 380th day after the last date of original issuance of the Notes, the Company will pay additional interest on the Notes outstanding during the period in which the Notes remain so restricted.

After deducting costs incurred of $6.0 million, the Company raised net proceeds from the issuance of long-term convertible debt of $159.0 million in April 2018. All costs were deferred and are being amortized over the life of the Notes at an effective interest rate of 5.47% and recorded as additional interest expense.

The Company has evaluated the Indenture for derivatives pursuant to ASC 815, *Derivatives and Hedging*, or ASC 815, and identified an embedded derivative that requires bifurcation as the feature is not clearly and closely related to the host instrument. The embedded derivative is a default provision, which could require additional interest payments. The Company has determined that the fair value of this embedded derivative was nominal during the year ended December 31, 2018.

The Company evaluated the conversion feature and determined it was not within the scope of ASC 815 and therefore is not required to be accounted for separately. The Company concluded that the embedded conversion option is not subject to separate accounting pursuant to either the cash conversion guidance or the beneficial conversion feature guidance. Under the general conversion guidance in ASC 470, *Debt*, all of the proceeds received from the Notes was recorded as a liability on the condensed consolidated balance sheet.

The following table summarizes how the issuance of the Notes is reflected in the Company's consolidated balance sheets at December 31, 2018 and 2017 (in thousands):

	Year Ended December 31,	
	2018	2017
Gross proceeds	$ 165,000	$ —
Unamortized debt discount costs	(5,434)	—
Carrying Value	$ 159,566	$ —

The Company recognized coupon interest expense of $5.4 million and amortization expense on the debt issuance costs of $0.6 million for the year ended December 31, 2018.

Long-term debt on the Company's consolidated balance sheets at December 31, 2018 and 2017 includes the carrying value of the Hercules Loan Agreement, as amended, and the Notes.

Royalty-Backed Loan Agreement

On February 25, 2019, the Company, through its wholly-owned subsidiary Paratek Royalty Corporation, or the Subsidiary, entered into a royalty-backed loan agreement, or the Royalty-Backed Loan Agreement, with Healthcare Royalty Partners III, L.P., or the Lender. Pursuant to the terms of the Royalty-Backed Loan Agreement, upon the satisfaction of the condition's precedent set forth therein, the Subsidiary expects to borrow a $32.5 million loan, which will be secured by, and repaid based upon, royalties from the Almirall Collaboration Agreement.

Under the Royalty-Backed Loan Agreement, the outstanding principal balance will bear interest at an annual rate of 12.0%. Payments of interest under the Royalty-Backed Loan Agreement will be made quarterly, beginning in August2019, out of the Almirall Collaboration Agreement. Royalty payments received since the immediately preceding payment date. On each interest payment date, any royalty payments in excess of accrued interest on the loan will be used to repay the principal of the loan until the balance is fully repaid. In addition, the Subsidiary will make up-front payments to the Lender of (i) a 1.5% fee and (ii) up to $300,000 for the Lender's expenses. The Royalty-Backed Loan Agreement matures on May 1, 2029, at which time, if not earlier repaid in full, the outstanding principal amount of the loan, together with any accrued and unpaid interest, and all other obligations then outstanding, shall be due and payable in cash. The Company has entered into a Pledge and Security Agreement in favor of the Lender, pursuant to which the Subsidiary's obligations under the Loan Agreement are secured by a pledge of all of the Company's holdings of the Subsidiary's capital stock.

The Royalty-Backed Loan Agreement contains certain customary affirmative covenants, including those relating to: use of proceeds; maintenance of books and records; financial reporting and notification; compliance with laws; and protection of Company intellectual property. The Royalty-Backed Loan Agreement also contains certain customary negative covenants, barring the Subsidiary from: certain fundamental transactions; issuing dividends and distributions; incurring additional indebtedness outside of the ordinary course of business; engaging in any business activity other than related to the Almirall Collaboration Agreement; and permitting any additional liens on the collateral provided to Lender under the Royalty-Backed Loan Agreement.

The Royalty-Backed Loan Agreement contains customary defined events of default, upon which any outstanding principal and unpaid interest shall be immediately due and payable. These include: failure to pay any principal or interest when due; any uncured breach of a representation, warranty or covenant; any uncured failure to perform or observe covenants; any uncured cross default under a material contract; any uncured breach of the Company's representations, warranties or covenants under its Contribution and Servicing Agreement with the Subsidiary; any termination of the Almirall Collaboration Agreement; and certain bankruptcy or insolvency events.

15. Income Taxes

(Loss) income before income taxes consists of the following:

(in thousands)	Year Ended December 31, 2018	2017
United States	$ (106,654)	$ (83,762)
Foreign	(5,200)	(4,554)
Total	$ (111,854)	$ (88,316)

The components of income tax (benefit) expense consist of the following:

(in thousands)	Year Ended December 31, 2018	2017
Foreign	502	753
Total	$ 502	$ 753

There is no provision for income taxes in the United States because the Company has historically incurred net operating losses and maintains a full valuation allowance against its net deferred tax assets. The provision for income taxes in foreign jurisdictions relate to withholding taxes incurred in connection with the Zai Collaboration Agreement.. The reported amount of income tax expense for the years differs from the amount that would result from applying domestic federal statutory tax rates to pretax losses primarily because of changes in valuation allowance.

During 2017, the Company recorded tax changes for the impact of the Tax Cuts and Jobs Act effects using the current available information and technical guidance on the interpretations of the Tax Cuts and Jobs Act. As permitted by SEC Staff Accounting Bulletin 118, Income Tax Accounting Implications of the Tax Cuts and Jobs Act, the Company recorded provisional estimates and have subsequently finalized our accounting analysis based on the guidance, interpretations, and data available as of December 31, 2018. Adjustments made in the fourth quarter of 2018 upon finalization of our accounting analysis were not material to our Consolidated Financial Statements.

A reconciliation of the Company's effective tax rate to the statutory federal income tax rate is as follows:

	Year Ended December 31, 2018	2017
Federal statutory rate	21.00%	35.00%
Change in valuation allowance	(22.16)	17.61
Permanent differences	(1.83)	0.66
State taxes, net of federal benefits	4.16	5.57
Withholding Tax	(0.45)	(0.85)
Impact of Tax Law Change	—	(59.79)
Foreign Rate Differential	(0.98)	(1.80)
Federal R&D credits	1.13	2.49
Other	(1.32)	0.25
	(0.45)%	(0.86)%

Significant components of the Company's net deferred tax assets at December 31, 2018 and 2017 are as follows:

(in thousands)	Year Ended December 31, 2018	2017
Non-current deferred tax assets		
Net operating losses	$ 95,273	$ 69,977
Accrued expenses	245	228
Capitalized research and development	21,296	24,904
Tax credit carryforwards	12,757	12,843
Other	95	47
Stock compensation and other	11,334	8,218
Total non-current deferred tax assets	141,000	116,217
Non-current deferred tax liabilities		
Intangible assets	—	(39)
Total non-current deferred tax liabilities	—	(39)
Net non-current deferred tax asset	141,000	116,178
Less: valuation allowance	(141,000)	(116,178)
Net deferred tax asset	$ —	$ —

As of December 31, 2018, the Company had federal and state net operating loss carryforwards of $374.0 million and $263.0 million, respectively, which begin to expire in 2024. The Company's federal net operating losses include $94.0 million, which can be carried forward indefinitely.

As of December 31, 2018, the Company had federal and state research and development tax credits carryforwards of $11.0 million and $3.0 million, respectively, which began to expire in 2019.

Management of the Company has evaluated the positive and negative evidence bearing upon the realizability of its deferred tax assets, which are composed principally of net operating loss carryforwards and research and development credits. Under the applicable accounting standards, management has considered the Company's history of losses and concluded that it is more likely than not that the Company will not recognize the benefits of federal and state deferred tax assets. Accordingly, a full valuation allowance of $141.0 million and $116.2 million, respectively, was established as of December 31, 2018 and 2017. A change in the Company's valuation allowance was recorded in 2018, in the amount of $24.8 million due primarily to the generation of net operating losses.

Utilization of the net operating loss and research and development credit carryforwards may be subject to a substantial annual limitation under Sections 382 and 383 of the Internal Revenue Code of 1986, as amended, due to ownership change limitations that have occurred previously or that could occur in the future. These ownership changes may limit the amount of net operating loss and research and development credit carryforwards that can be utilized annually to offset future taxable income and tax, respectively.

The Company conducted an analysis under Section 382 and 383 of the Internal Revenue Code of 1986, as amended, to determine if historical changes in ownership through December 31, 2017 would limit or otherwise restrict its ability to utilize its net operating loss and research and development credit carryforwards. As a result of that study, the Company has identified certain net operating losses that might expire unused. The Company has established a full valuation allowance against these attributes.

The Company follows the provisions of ASC 740-10, *Accounting for Uncertainty in Income Taxes—an interpretation of ASC 740*, which requires it to determine whether a tax position of the Company is more likely than not to be sustained upon examination, including resolution of any related appeals of litigation processes, based on the technical merits of the position. For tax positions meeting the more likely than not threshold, the tax amount recognized in the financial statements is reduced by the largest benefit that has a greater than fifty percent likelihood of being realized upon the ultimate settlement with the relevant taxing authority.

The Company completed a study of its research and development credits. As a result of this study the Company adjusted its deferred tax asset related to research and development credit carryforwards. The Company has not identified or recorded any uncertain tax positions related to this study. A full valuation allowance has been provided against the Company's research and development credits, and if an adjustment is required, this adjustment would be offset by an adjustment to the valuation allowance. Thus, there would be no impact to the consolidated balance sheets or statements of operations if an adjustment were required.

The Company files tax returns as prescribed by the tax laws of the jurisdictions in which it operates. In the normal course of business, the Company is subject to examination by federal and state jurisdictions, where applicable. The earliest tax years that remain subject to examination by jurisdiction is 2014 for both federal and Massachusetts. However, to the extent the Company utilizes net operating losses from years prior to 2014, the statute remains open to the extent of the net operating losses or other credits are utilized. The Company's policy is to record interest and penalties related to income taxes as part of the tax provision. There was no interest or penalties pertaining to uncertain tax positions in 2018 or 2017.

16. Commitments and Contingencies

Leases

The Company leases its Boston, Massachusetts and King of Prussia, Pennsylvania office spaces under non-cancelable operating leases expiring in 2021 and 2024, respectively.

The Company entered into the original King of Prussia and Boston leases in January 2015 and April 2015, respectively. The lease terms under the original agreements were for six and four years, respectively. Each agreement had one renewal option for an extended term. The King of Prussia and Boston lease terms under the original agreements began in June 2015 and July 2015, respectively.

The Company executed an amended lease agreement on its Boston office space in July 2016. The amended lease agreement added 4,153 rentable square feet of office space and extended the original lease term by two years. The total revised lease commitment of $3.4 million is over a remaining four-year lease term. In accordance with the amended lease agreement, the Company paid a security deposit of $0.1 million. The Company is required to make additional payments under the facility operating leases for taxes, insurance, and other operating expenses incurred during the lease period. In addition, the lease provided an incentive from the landlord of up to $0.2 million in tenant improvements. The Company capitalized all leasehold improvements as fixed assets. Accordingly, the Company also recorded a related financing obligation in "other long-term liabilities" on the Company's consolidated balance sheet. These amounts will be treated as a reduction to rent expense over the lease term. Subsequent to the amended lease agreement, the Company records monthly rent expense of approximately $54,000 for the Boston office space.

The Company executed an amended lease agreement on its King of Prussia office space in October 2016. The amended lease agreement is for 19,708 rentable square feet of office space, for a total commitment of $3.3 million with respect to which lease payments became due beginning once the Company took control of such office space during the first quarter of 2017. The total lease commitment is over a seven-year and seven-month lease term. The amended lease agreement contains rent escalation and a partial rent abatement period, which is accounted for as rent expense under the straight-line method. The Company is required to make additional payments under the facility operating leases for taxes, insurance, and other operating expenses incurred during the operating lease period.

Deferred rent of $0.5 million is included in other liabilities in the consolidated balance sheet as of December 31, 2018 and 2017.

Rent expense, exclusive of related taxes, insurance, and maintenance costs, for continuing operations totaled approximately $1.0 million and $1.0 million for the years ended December 31, 2018, and 2017, respectively, and is reflected in operating expenses.

Future minimum operating lease obligations under non-cancelable leases with initial terms of more than one-year are as follows (in thousands):

	Minimum Lease Obligation
Years Ended December 31,	
2019	1,156
2020	1,178
2021	964
2022	508
2023	518
2024 and thereafter	396
Total	$ 4,720

Commercial Supply Agreements

CIPAN

In November 2016, the Company entered into a manufacturing and services agreement with CIPAN – Companhia Industrial Produtora de Antibióticos, or CIPAN. The agreement, as subsequently amended, provides the terms and conditions under which CIPAN will manufacture and supply to the Company increased quantities of minocycline starting material and crude omadacycline, or the CIPAN Products, for purification into omadacycline and, subsequently, for use in the Company's products that contain omadacycline tosylate as the active pharmaceutical ingredient. Under this agreement, the Company is obligated to pay a CIPAN Product price in the four-digit U.S. dollar range per kilogram for minocycline starting material and in the four-digit or five-digit U.S. dollar range per kilogram for crude omadacycline, based on the annual volume of crude omadacycline that the Company orders, subject to adjustments as set forth in the agreement. CIPAN will also perform certain services related to development, technology transfer and manufacturing of the CIPAN Products as provided in one or more statements of work, which shall set forth the fees payable by the Company to CIPAN for such services.

The Company's agreement with CIPAN will remain in effect for a fixed initial term, after which the agreement will continue, with respect to each CIPAN Product, for successive renewal terms unless either the Company or CIPAN have given written notice of termination within a certain period prior to the expiration of either the initial or then-current renewal term. The agreement may also be terminated under certain other circumstances, including by either party due to a material uncured breach by the other party or the other party's insolvency.

Carbogen

In December 2016, the Company entered into an outsourcing agreement with CARBOGEN AMCIS AG, or Carbogen. The agreement, as subsequently amended, provides for the terms and conditions under which Carbogen will manufacture and supply to the Company the active pharmaceutical ingredient for our omadacycline drug products in bulk quantities, or the Carbogen Product. Under this agreement, the Company is responsible for the cost and supply of crude omadacycline that Carbogen requires to manufacture the Carbogen Products and perform related services. The Company is obligated to pay Carbogen an amount in the seven-digit U.S. dollar range per batch of Carbogen Product that the Company orders, depending on the size of the campaign, and the price may be adjusted in accordance with the terms of the agreement. The Company may also request that Carbogen perform certain services related to the Carbogen Product, for which the Company will pay reasonable compensation to Carbogen.

The Company's agreement with Carbogen will remain in effect for a fixed initial term and subsequent renewal terms. Both parties, however, are required to use diligent efforts to replace the existing agreement with a subsequent long-term agreement. The Company may terminate this agreement by delivering notice of termination to Carbogen prior to the expiration of the initial or subsequent term. The agreement may also be terminated under certain other circumstances, including by either party due to a material uncured breach by the other party or the other party's insolvency.

Almac

In December 2016, the Company entered into a manufacturing and services agreement with Almac Pharma Services Limited, or Almac. The agreement provides for the terms and conditions under which Almac will manufacture, package and supply to the Company omadacycline oral solid dosage tablets in bulk form, or the Almac Products. Under this agreement, the Company is required to use commercially reasonable efforts to timely provide Almac with the active pharmaceutical ingredient needed to manufacture the Almac Products and perform related services. The Company is obligated to pay a supply price in the five-digit range in Great Britain Pounds per batch of the Almac Products, subject to adjustments as provided in the agreement. The Company will also negotiate with Almac, as part of each individual scope of work, the reasonable costs for the services to be performed for the Company by Almac.

The Company's agreement with Almac will remain in effect for a fixed initial term, after which the agreement will continue for successive renewal terms unless either the Company or Almac have given written notice of termination within a certain period prior to the expiration of the initial or then-current renewal term. The agreement may also be terminated under certain other circumstances, including by either party due to a material uncured breach of the other party or the other party's insolvency.

Patheon

In July 2017, the Company entered into a master manufacturing services agreement and corresponding product agreement with Patheon UK Limited, or Patheon. The product agreement was amended in January 2019 to reflect exchange rate and pricing updates. The agreements provide for the terms and conditions under which Patheon will manufacture, package and supply to the Company, omadacycline in injectable form, or the Patheon Products. Under these agreements, the Company is required to deliver to Patheon the active pharmaceutical ingredient needed to manufacture the Patheon Products. The Company is obligated to pay a supply price in the six-digit dollar range per batch of the Patheon Products, subject to adjustments as provided in the agreements. Now that the Company's omadacycline product has been approved, the Company is also subject to an annual minimum purchase requirement in the six-digit U.S. dollar range. If the Company desires for Patheon to conduct additional services other than those expressly set forth in the agreements, those would be subject to additional fees.

The Company's agreements with Patheon will remain in effect for a fixed initial term, after which they will continue for successive renewal terms unless either the Company or Patheon have given written notice of termination within a certain period prior to the expiration of the applicable initial or then-current renewal term. The agreements may also be terminated under certain other circumstances, including by either party due to a material uncured breach of the other party or the other party's insolvency.

Litigation

The following pending litigation was assumed through the Merger.

Patent Term Adjustment Suit

In January 2013, the Company filed suit in the Eastern District of Virginia against the United States Patent and Trademark Office, or the USPTO, seeking recalculation of the patent term adjustment of the '131 Patent. Purdue Pharma has agreed to bear the costs and expenses associated with this litigation. In June 2013, the judge granted a joint motion to stay the proceedings pending a remand to the USPTO, in which the USPTO is expected to reconsider its patent term adjustment award in light of decisions in a number of appeals to the Federal Circuit, including Novartis AG v. Lee 740 F.3d 593 (Fed. Cir. 2014), or the Novartis decision. Since having issued final rules implementing the Novartis decision, the USPTO has been working through the civil action cases and issuing remand decisions. The Company's case was on remand until the USPTO made its decision on the recalculation of the patent term adjustment. On September 28, 2016, the USPTO issued a decision that the patent term adjustment is 1,038 days, from which the '131 Patent expiration would be March 26, 2029.

Other Legal Proceedings

From time to time the Company is involved in legal proceedings arising in the ordinary course of business. The Company believes there is no other litigation pending that could have, individually, or in the aggregate, a material adverse effect on its results of operations or financial condition. The Company does not believe that any of the above matters will result in a liability that is probable or estimable at December 31, 2018.

17. 401(k) Savings Plan

The Company maintains a defined-contribution savings plan under Section 401(k) of the Internal Revenue Code, or the 401(k) Plan. The 401(k) Plan covers all employees who meet defined minimum age and service requirements and allows participants to defer a portion of their annual compensation on a pretax basis. The Plan provides for matching contributions on a portion of participant contributions pursuant to the 401(k) Savings Plan's matching formula. All matching contributions and participant contributions vest immediately. Contributions totaled $0.5 million and$0.4 million for the years ended December 31, 2018 and 2017, respectively and have been recorded in the consolidated statements of operations.

18. Quarterly Results (Unaudited)

	Three Months Ended			
	March 31, 2018	June 30, 2018	September 30, 2018	December 31, 2018
	(in thousands, except per share data) (unaudited)			
Revenue	$ 10	$ 40	$ 50	$ 17,017
Operating expenses	26,722	27,769	29,660	37,051
Loss from operations	(26,712)	(27,729)	(29,610)	(20,034)
Other expense, net	(1,038)	(2,004)	(2,473)	(2,253)
Provision for income tax	—	—	—	502
Net loss	$ (27,750)	$ (29,733)	$ (32,083)	$ (22,789)
Net loss per share - basic and diluted	$ (0.91)	$ (0.94)	$ (1.01)	$ (0.71)

	Three Months Ended			
	March 31, 2017	June 30, 2017	September 30, 2017	December 31, 2017
	(in thousands, except per share data) (unaudited)			
Revenue	$ 18	$ 7,514	$ 12	$ 5,072
Operating expenses	26,789	24,159	20,309	25,939
Loss from operations	(26,771)	(16,645)	(20,297)	(20,867)
Other expense, net	(899)	(785)	(1,027)	(1,025)
Provision for income tax	—	753	—	—
Net loss	$ (27,670)	$ (18,183)	$ (21,324)	$ (21,892)
Net loss per share - basic and diluted	$ (1.14)	$ (0.66)	$ (0.77)	$ (0.78)

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

Not applicable.

Item 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

As of December 31, 2018, management, with the participation of our Chief Executive Officer and Chief Financial Officer, performed an evaluation of the effectiveness of the design and operation of our disclosure controls and procedures as defined in Rules 13a-15(e) and 15d-15(e) of the Exchange Act. Our disclosure controls and procedures are designed to ensure that information required to be disclosed in the reports we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and that such information is accumulated and communicated to our management, including the Chief Executive Officer and the Chief Financial Officer, to allow timely decisions regarding required disclosures. Any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objective. Based on this evaluation, our Chief Executive Officer and Chief Financial Officer concluded that, as of December 31, 2018, the design and operation of our disclosure controls and procedures were effective.

Internal Control Over Financial Reporting

(a) Management's Annual Report on Internal Control over Financial Reporting

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, is responsible for establishing and maintaining adequate internal control over financial reporting, as defined in Rule 13a-15(f) and 15d-15(f) of the Exchange Act. Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policy or procedures may deteriorate. Under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, management has conducted an evaluation of the effectiveness of our internal control over financial reporting as of December 31, 2018 based upon the Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework). Based on this evaluation, management, including our Chief Executive Officer and Chief Financial Officer, has concluded that our internal control over financial reporting was effective as of December 31, 2018.

The effectiveness of our internal control over financial reporting as of December 31, 2018 has been audited by Ernst & Young LLP, our independent registered public accounting firm, as stated in their report which is included herein.

(b) Report of Independent Registered Public Accounting Firm on Internal Control over Financial Reporting

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors of Paratek Pharmaceuticals, Inc.

Opinion on Internal Control over Financial Reporting

We have audited Paratek Pharmaceuticals, Inc.'s internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, Paratek Pharmaceuticals, Inc. (the Company) maintained in all material respects, effective internal control over financial reporting as of December 31, 2018, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of Paratek Pharmaceuticals, Inc. as of December 31, 2018 and 2017, the related consolidated statements of operations and comprehensive loss, stockholders' equity, and cash flows for the years then ended, and the related notes and our report dated March 5, 2019 expressed an unqualified opinion thereon.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management's Annual Report on Internal Control over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the 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 audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects.

Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ Ernst & Young LLP

Boston, Massachusetts
March 5, 2019

(c) Changes in Internal Control over Financial Reporting

There were no changes in our internal control over financial reporting (as defined in Rule 13a-15(f) under the Exchange Act) during the fiscal quarter ended December 31, 2018, that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information

None.

PART III

The information required by Part III is omitted from this report because we will file a definitive proxy statement within 120 days after the end of our 2018 fiscal year pursuant to Regulation 14A for our 2018 Annual Meeting of Stockholders, or the 2019 Proxy Statement, and the information to be included in the 2019 Proxy Statement is incorporated herein by reference.

Item 10. Directors, Executive Officers and Corporate Governance

The information required by this item will be contained in the 2019 Proxy Statement and is hereby incorporated by reference.

Section 16(a) Beneficial Ownership Reporting Compliance

The information required by this item will be contained in the 2019 Proxy Statement and is hereby incorporated by reference.

Code of Business Conduct and Ethics

Our Board of Directors has adopted a code of business conduct and ethics. The code of business conduct applies to all of our employees, officers and directors. The full texts of our code of business conduct and ethics are posted on our website at http://www.paratekpharma.com under the Investor Relations section. We intend to disclose future amendments to our code of business conduct and ethics, or certain waivers of such provisions, at the same location on our website identified above and also in public filings. The inclusion of our website address in this report does not include or incorporate by reference the information on our website into this report.

Item 11. Executive Compensation

The information required by this item will be contained in the 2019 Proxy Statement and is hereby incorporated by reference.

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

The information required by this item will be contained in the 2019 Proxy Statement and is hereby incorporated by reference.

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

The information required by this item will be contained in the 2019 Proxy Statement and is hereby incorporated by reference.

Item 14. Principal Accountant Fees and Services

The information required by this item will be contained in the 2019 Proxy Statement and is hereby incorporated by reference.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a)(1) Financial Statements

See Index to Financial Statements under Item 8 of Part II of this Annual Report on Form 10-K, which listing is incorporated herein by reference.

(a)(2) Financial Statement Schedules

Financial statement schedules are omitted because they are not applicable or are not required or the information required to be set forth therein is included in the Financial Statements or notes thereto.

(a)(3) Exhibits

EXHIBIT INDEX

Exhibit No.	Exhibit Description	Incorporated by Reference			
		Schedule/ Form	File Number	Exhibit	Filing Date
2.1	Agreement and Plan of Merger and Reorganization by and among Transcept Pharmaceuticals, Inc., Tigris Merger Sub, Inc., Tigris Acquisition Sub, LLC and Paratek Pharmaceuticals, Inc. dated as of June 30, 2014.	Form 8-K	001-36066	2.1	July 1, 2014
3.1	Amended and Restated Certificate of Incorporation.	Form 8-K	001-36066	3.1	October 31, 2014
3.2	Certificate of Amendment to the Amended and Restated Certificate of Incorporation.	Form 8-K	001-36066	3.2	October 31, 2014
3.3	Certificate of Elimination of Series A Junior Participating Preferred Stock.	Form 8-K	001-36066	3.1	July 24, 2015
3.4	Amended and Restated Bylaws.	Form 8-K	001-36066	3.1	April 16, 2015
4.1	Specimen Common Stock Certificate.	Form S-3	333-201458	4.2	January 12, 2015
4.2	Form of Warrant Agreement issued to Hercules Technology II, L.P. and Hercules Technology III, L.P.	Form 8-K	001-36066	4.1	October 5, 2015
4.3	Form of Warrant Agreement issued to Hercules Technology II, L.P. and Hercules Technology III, L.P.	Form 8-K	001-36066	4.1	December 13, 2016
4.4	Form of Warrant Agreement issued to Hercules Capital, Inc.	Form 8-K	001-36066	4.1	June 29, 2017
4.5	Warrant Agreement issued to Hercules Capital, Inc.	Form 10-Q	001-36066	4.5	August 2, 2018
4.6	Warrant, dated as of April 7, 2014, issued to HBM Healthcare Investments (Cayman) Ltd.	Form 10-K	001-36066	10.22	April 2, 2015
4.7	Warrant, dated as of April 18, 2014 issued to K/S Danish BioVenture.	Form 10-K	001-36066	10.23	April 2, 2015
4.8	Warrant, dated as of April 7, 2014 issued to Omega Fund III, L.P.	Form 10-K	001-36066	10.24	April 2, 2015
4.9	Indenture, dated as of April 23, 2018, by and between the Company and U. S. Bank National Association (including the form of the 4.75% Convertible Senior Subordinated Note due 2024).	Form 8-K	001-36066	4.1	April 23, 2018
4.10	Form of 4.75% Convertible Senior Subordinated Note due 2024 (included in Exhibit 4.9)	Form 8-K	001-36066	4.2	April 23, 2018
10.1A+	2006 Incentive Award Plan, as amended and restated.	Form 10-K	001-36066	10.1A	March 9, 2016
10.1B+	Form of Stock Option Grant Notice and Stock Option Agreement under 2006 Incentive Award Plan.	Form S-8	333-172041	99.2	February 3, 2011

Exhibit No.	Exhibit Description	Incorporated by Reference			
		Schedule/ Form	File Number	Exhibit	Filing Date
10.1C+	Form of Restricted Stock Unit Award Grant Notice and Restricted Stock Unit Award Agreement under the 2006 Incentive Award Plan, as amended.	Form 8-K	001-36066	10.1	February 10, 2015
10.2+	2009 Employee Stock Purchase Plan.	Form 8-K	000-51967	10.1	June 9, 2009
10.3+	2018 Employee Stock Purchase Plan, as amended.	Form 10-Q	001-36066	10.4	November 6, 2018
10.4A+	2014 Equity Incentive Plan, as amended.	Form S-8	333-201204	4.1	December 22, 2014
10.4B+	Form of Option Agreement under the 2014 Equity Incentive Plan, as amended.	Form S-8	333-201204	4.2	December 22, 2014
10.5A+	2015 Inducement Plan.	Form 8-K	001-36066	10.2	February 10, 2015
10.5B+	Form of Stock Option Grant Notice and Option Agreement under the 2015 Inducement Plan.	Form 8-K	001-36066	10.3	February 10, 2015
10.6A+	Paratek Pharmaceuticals, Inc. 2017 Inducement Plan, as amended	Form 8-K	001-36066	10.1	October 18, 2018
10.6B+	Form of Stock Option Grant Notice and Option Agreement under the 2017 Inducement Plan.	Form 8-K	001-36066	10.2	June 16, 2017
10.6C+	Form of Restricted Stock Unit Grant Notice and Restricted Stock Unit Award Agreement under the 2017 Inducement Plan.	Form 8-K	001-36066	10.3	June 16, 2017
10.7A+	2015 Equity Incentive Plan	Form S-8	333-205482	99.5	July 2, 2015
10.7B+	Form of Stock Option Grant Notice and Option Agreement under the 2015 Equity Incentive Plan	Form S-8	333-205482	99.6	July 2, 2015
10.7C+	Form of Restricted Stock Unit Grant Notice and Restricted Stock Unit Award Agreement under the 2015 Equity Incentive Plan.	Form S-8	333-205482	99.7	July 2, 2015
10.7D+	Form of Leadership Team Restricted Stock Unit Grant Notice and Restricted Stock Unit Award Agreement under the 2015 Equity Incentive Plan.	Form 8-K	001-36066	10.1	August 4, 2017
10.7E+	Form of Director Restricted Stock Unit Grant Notice and Restricted Stock Unit Award Agreement under the 2015 Equity Incentive Plan.	Form 10-K	001-36066	10.6E	March 6, 2018
10.7F+	Form of Director Stock Option Grant Notice and Option Agreement under the 2015 Equity Incentive Plan.	Form 10-K	001-36066	10.6F	March 6, 2018
10.8+	Paratek Pharmaceuticals, Inc. Annual Incentive Plan.	Form 8-K	001-36066	10.4	June 16, 2017
10.9+	Non-Employee Director Compensation Policy.	Form 10-K	001-36066	10.8	March 6, 2018
10.10A+	Revenue Performance Incentive Plan	Form 8-K	001-36066	10.1	October 4, 2018

Exhibit No.	Exhibit Description	Incorporated by Reference			Filing Date
		Schedule/ Form	File Number	Exhibit	
10.10B+	Form of Award Agreement under the Revenue Performance Incentive Plan	Form 8-K	001-36066	10.2	October 4, 2018
10.11+	Form of Indemnification Agreement between the Company, its executive officers and directors.	Form 10-K	001-36066	10.8	March 9, 2016
10.12†	Collaborative Research and License Agreement by and between the Company and Warner Chilcott, dated as of July 2, 2007.	Form 10-K	001-36066	10.16	April 2, 2015
10.13†	License and Collaboration Agreement by and between Paratek Bermuda Ltd. and Zai Lab (Shanghai) Co., Ltd., dated April 21, 2017.	Form 10-Q	001-36066	10.11	August 2, 2017
10.14†	License Agreement by and between the Company and Tufts University dated as of February 1, 1997, as amended.	Form 10-K	001-36066	10.17	March 6, 2018
10.15	Amendment No. 10, dated as of March 21, 2017, to the License Agreement by and between the Company and Tufts University	Form 10-Q	001-36066	10.1	May 4, 2017
10.16†	Amendment No. 11, dated as of November 15, 2017, to the License Agreement by and between the Company and Tufts University	Form 10-K	001-36066	10.19	March 6, 2018
10.17+	Amended and Restated Employment Agreement by and between the Company and Douglas W. Pagán, dated as of August 4, 2017.	Form 10-Q	001-36066	10.4	November 8, 2017
10.18+	Amended and Restated Employment Agreement, by and between the Company and Michael F. Bigham, dated as of August 4, 2017.	Form 10-Q	001-36066	10.1	November 8, 2017
10.19+	Amended and Restated Employment Agreement, by and between the Company and Evan Loh, M.D., dated as of August 4, 2017.	Form 10-Q	001-36066	10.3	November 8, 2017
10.20+	Amended and Restated Employment Agreement, by and between the Company and Adam Woodrow, dated as of August 4, 2017.	Form 10-Q	001-36066	10.5	November 8, 2017
10.21+	Amended and Restated Employment Agreement, by and between the Company and William M. Haskel, dated as of August 4, 2017.	Form 10-Q	001-36066	10.2	November 8, 2017
10.22	Stock Purchase Agreement dated October 1, 2015, by and between Paratek Pharmaceuticals, Inc. and Hercules Technology Growth Capital, Inc.	Form 8-K	001-36066	10.1	October 5, 2015

Exhibit No.	Exhibit Description	Incorporated by Reference			
		Schedule/ Form	File Number	Exhibit	Filing Date
10.23†	Loan and Security Agreement, dated September 30, 2015, between the Company and Hercules Technology II, L.P., Hercules Technology III, L.P., certain other lenders and Hercules Technology Growth Capital, Inc.	Form 10-Q/A	001-36066	10.5	December 3, 2015
10.24	Amendment No. 1 to Loan and Security Agreement dated November 10, 2015, by and among Paratek Pharmaceuticals, Inc., Paratek Pharma, LLC, Hercules Technology II, L.P., Hercules Technology III, L.P., certain other lenders and Hercules Technology Growth Capital, Inc.	Form 10-K	001-36066	10.23	March 2, 2017
10.25	Amendment No. 2 to Loan and Security Agreement dated December 12, 2016, by and among Paratek Pharmaceuticals, Inc., Paratek Pharma, LLC, Hercules Technology II, L.P., Hercules Technology III, L.P., certain other lenders and Hercules Technology Growth Capital, Inc.	Form 8-K	001-36066	10.1	December 13, 2016
10.26	Amendment No. 3 to Loan and Security Agreement dated June 27, 2017, by and among Paratek Pharmaceuticals, Inc., Paratek Pharma, LLC, Hercules Technology II, L.P., Hercules Technology III, L.P., and Hercules Capital, Inc.	Form 8-K	001-36066	10.1	June 29, 2017
10.27	Amendment No. 4 to the Loan and Security Agreement, dated April 17, 2018, by and among the Company, Paratek Pharma, LLC, Hercules Technology II, L.P., Hercules Technology III, L.P. and Hercules Capital, Inc.	Form 8-K	001-36066	4.3	April 23, 2018
10.28	Amendment No. 5 to the Loan and Security Agreement, dated August 1, 2018, by and among the Company, Paratek Pharma, LLC, Hercules Technology II, L.P., Hercules Technology III, L.P. and Hercules Technology Growth Capital, Inc.	Form 10-Q	001-36066	10.3	August 2, 2018
10.29	Boston Lease Agreement between Paratek Pharma LLC and TDC Heritage LLC, dated as of April 24, 2015, as amended.	Form 10-Q	001-36066	10.3	May 4, 2017
10.30	King of Prussia Lease Agreement between Paratek Pharma LLC and Atlantic American Properties Trust, dated as of January 23, 2015, as amended.	Form 10-Q	001-36066	10.2	May 4, 2017

Exhibit No.	Exhibit Description	Incorporated by Reference			
		Schedule/ Form	File Number	Exhibit	Filing Date
10.31†	Manufacturing and Services Agreement by and between the Company and Almac Pharma Services Limited, dated as of December 30, 2016.	Form 10-K/A	001-36066	10.27	May 5, 2017
10.32†	Amended and Restated Manufacturing and Services Agreement, by and between the Company and CIPAN - Companhia Industrial Produtora de Antibióticos, S.A., dated as of April 18, 2018.	Form 10-Q	001-36066	10.2	August 2, 2018
10.33*^	First Amendment of Amended and Restated Manufacturing and Services Agreement, by and between the Company and CIPAN – Companhia Industrial Produtora de Antibióticos, S.A., dated as of February 18, 2019.				
10.34†	Outsourcing Agreement by and between the Company and CARBOGEN AMCIS AG, dated as of December 30, 2016.	Form 10-K/A	001-36066	10.29	May 5, 2017
10.35*^	First Amendment of Outsourcing Agreement, by and between the Company and CARBOGEN AMCIS AG, dated as of December 18, 2018.				
10.36†	Master Manufacturing Service Agreement by and between the Company and Patheon UK Limited dated as of July 28, 2017 and Product Agreement by and between the Company and Patheon UK Limited dated as of July 28, 2017.	Form 10-Q/A	001-36066	10.12	November 6, 2017
21.1*	Subsidiaries of the Company.				
23.1*	Consent of Ernst & Young LLP, Independent Registered Public Accounting Firm.				
24.1	Power of Attorney (included on signature page)				
31.1*	Certification of the Company's Chief Executive Officer pursuant to Rule 13a-14(a) and Rule 15d-14(a) of the Securities and Exchange Act of 1934, as amended, pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.				
31.2*	Certification of the Company's Chief Financial Officer pursuant to Rule 13a-14(a) and Rule 15d-14(a) of the Securities and Exchange Act of 1934, as amended, pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.				

Exhibit No.	Exhibit Description	Incorporated by Reference			
		Schedule/ Form	File Number	Exhibit	Filing Date
32.1*	Certification of the Company's Chief 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 the Company's Chief 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 Labels Linkbase Document.				
101.PRE*	XBRL Taxonomy Extension Presentation Linkbase Document.				

* Filed herewith.
† Confidential treatment has been granted as to certain portions, which portions have been omitted and submitted separately to the Securities and Exchange Commission.
^ Confidential treatment has been requested as to certain portions, which portions have been omitted and submitted separately to the Securities and Exchange Commission.
\+ Management contract or compensatory plan, contract or arrangement.

(b) Exhibits

See Exhibits listed under Item 15(a)(3) above.

(c) Financial Statement Schedules

Financial statement schedules are omitted because they are not applicable or are not required or the information required to be set forth therein is included in the Financial Statements or notes thereto.

Item 16. Form 10-K Summary

Not applicable.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Boston, State of Massachusetts, on the 5th day of March, 2019.

Paratek Pharmaceuticals, Inc.

By: /s/ Michael F. Bigham
Michael F. Bigham
Chairman and Chief Executive Officer

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints each of William M. Haskel and Douglas W. Pagán his true and lawful attorney-in-fact and agent, with full power of substitution, for him and in his name, place and stead, in any and all capacities, to sign any and all amendments to this annual report on Form 10-K, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorney-in-fact and agent, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorney-in-fact and agent, or his substitutes or substitute, may lawfully do or cause to be done by virtue hereof.

IN WITNESS WHEREOF, each of the undersigned has executed this Power of Attorney as of the date indicated opposite his name.

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

Signature	Title	Date
/s/ Michael F. Bigham **Michael F. Bigham**	Chairman of the Board of Directors and Chief Executive Officer *(Principal Executive Officer)*	March 5, 2019
/s/ Douglas W. Pagán **Douglas W. Pagán**	Chief Financial Officer *(Principal Financial and Accounting Officer)*	March 5, 2019
/s/ Evan Loh, M.D. **Evan Loh, M.D.**	President, Chief Operating Officer, Chief Medical Officer and Director	March 5, 2019
/s/ Thomas J. Dietz, Ph.D. **Thomas J. Dietz, Ph.D.**	Director	March 5, 2019
/s/ Timothy R. Franson, M.D. **Timothy R. Franson, M.D.**	Director	March 5, 2019
/s/ Rolf K. Hoffmann **Rolf K. Hoffmann**	Director	March 5, 2019
/s/ Kristine Peterson **Kristine Peterson**	Director	March 5, 2019
/s/ Robert S. Radie **Robert S. Radie**	Director	March 5, 2019
/s/ Jeffrey Stein, Ph.D. **Jeffrey Stein, Ph.D.**	Director	March 5, 2019

THIS EXHIBIT HAS BEEN REDACTED AND IS THE SUBJECT OF A CONFIDENTIAL TREATMENT REQUEST. REDACTED MATERIAL IS MARKED WITH [***] AND HAS BEEN FILED SEPARATELY WITH THE SECURITIES AND EXCHANGE COMMISSION.

FIRST AMENDMENT OF AMENDED AND RESTATED MANUFACTURING AND SERVICES AGREEMENT

THIS FIRST AMENDMENT OF AMENDED AND RESTATED MANUFACTURING AND SERVICES AGREEMENT (the "**Amendment**") is made as of February 18, 2019 (the "**Effective Date**") by and between Paratek Pharmaceuticals, Inc., a corporation existing under the laws of Delaware, with an address at 75 Park Plaza, 4th Floor, Boston, MA 02116 ("**Paratek**") and CIPAN−Companhia Industrial Produtora de Antibióticos, S.A., a corporation organized and existing under the laws of Portugal with an address at Rua da Estação, nº42, 2600-726 Castanheira do Ribatejo, Portugal ("**CIPAN**", collectively referred to herein with Paratek as the "**Parties**" and each, a "**Party**"). Capitalized terms used, but not otherwise defined, herein shall have the meanings set forth in the Agreement.

WHEREAS, Paratek and CIPAN are parties to that certain Manufacturing and Services Agreement, dated November 2, 2016 (as amended on October 18, 2017, the "**Original Agreement**") and that Original Agreement was subsequently amended and restated by the Parties on April 18, 2018 (the "**Agreement**");

WHEREAS, Pursuant to the Agreement, (a) CIPAN is obligated to manufacture Minocycline HCI dihydrate meeting the Specifications ("**Minocycline**") and crude Omadacycline meeting the Specifications ("**Crude Omadacycline**" and, collectively with Minocycline, the "**Products**", and each, a "**Product**") for Paratek and (b) in exchange for technology and financial assistance from Paratek to CIPAN;

WHEREAS, the Parties now desire to amend the Agreement as set forth in this Amendment;

NOW THEREFORE, the Parties agree as follows:

1. **First Amendment to the Agreement**. The Agreement is amended and modified as follows:

   a. Section 7.1 is hereby amended and restated to read in its entirety as follows:

      i. Delivery. All Products shall be delivered [***]. CIPAN will notify Paratek at least ten (10) Business Days prior to any shipment of Product. CIPAN is responsible for the arrangement of transport of Products from the Facility to the shipping destination specified in the purchase order. [***] All Products shall be suitably prepared and packed for shipment in suitable containers in accordance with sound commercial practices to ensure that Products are delivered in an undamaged condition. CIPAN shall mark the relevant purchase order number on each container and enclose an itemized packing list with such number with the shipment. CIPAN shall hold title to and bear all risk of loss or damage to Products and Materials prior to

such item's delivery to Paratek or its designee hereunder. Time is of the essence for all deliveries of Products. CIPAN shall ensure that all Product held in storage is stored in accordance with the Specifications until delivery to Paratek under this Agreement and that all storage areas meet cGMP requirements. In the event of any delay in delivery of Product from the delivery date on the applicable purchase order for such Product, if such delay is: [***], unless, in each case ((a) and (b)), such delay is due to a Force Majeure Event causing a worldwide shortage of the applicable Materials, in which case Article 17 shall apply.

b. The following new Section 7.2 shall be added, and the numbering of the subsequent sections of Agreement shall be updated accordingly:

i. Minocycline. CIPAN shall ensure that all Minocycline held in storage is stored in accordance with the Specifications until such Minocycline is manufactured into Crude Omadacycline and delivered to Paratek or its designee and that all storage areas meet cGMP requirements. For the avoidance of doubt, Paratek shall not hold title to or bear any risk of loss or damage to any Minocycline prior to such Minocycline being manufactured into Crude Omadacycline and such Crude Omadacycline being delivered to Paratek in accordance with Section 7.1 (or, if such Minocycline is not to be manufactured into Crude Omadacycline under this Agreement, prior to delivery to Paratek of such Minocycline in accordance with Section 7.1).

c. Section 8.1 is hereby amended and restated to read in its entirety as follows:

i. Supply Price. The prices of Products to be sold to Paratek during the Term are set forth in Exhibit A attached hereto (and, with respect to Crude Omadacycline, shall be based on the annual volume of each such Product ordered by Paratek), subject to adjustment as set forth in Sections 2.8.1, 7.1, 8.2 and 8.3 (such price for a Product, the "**Supply Price**" for such Product). [***] The Supply Price per kilogram invoiced by CIPAN to Paratek for Minocycline during any rolling [***] shall be the [***]. The Supply Price for Minocycline shall comply with this Section 8.1 as of the Effective Date. For the avoidance of doubt, the Supply and Quality Committee will not have any responsibilities relating to the Supply Price matters unless such responsibilities are expressly provided in clause (f) of Section 4.3 of this Agreement.

d. Section 8.4 is hereby amended and restated to read in its entirety as follows:

i. Payment. Subject to the terms of this Section 8.4, CIPAN shall invoice Paratek for Products on or after the Approval Date and shall only charge Paratek for Products that are shipped to Paratek or Paratek's designee pursuant to this Agreement. Each invoice submitted to Paratek will include [***] as mutually agreed upon by the Parties. Except as expressly specified in this Section 8.4, Paratek shall pay CIPAN for all supplied quantities of conforming Products within [***] from the date of invoice receipt; provided that in the event that Paratek submits a purchase order to CIPAN for Minocycline to be used in the Manufacture of Crude Omadacycline by CIPAN under this Agreement, (A) CIPAN shall issue an invoice to Paratek for such purchase order following the Approval Date for such Minocycline for an amount equal to [***] of the Supply Price of the Crude Omadacycline ordered by Paratek to incorporate such Minocycline and Paratek shall pay CIPAN such invoiced amount within [***] from the date of invoice receipt and (B) following the delivery of such Crude Omadacycline to Paratek, CIPAN shall issue an invoice to Paratek for the remaining Supply Price of such Crude Omadacycline and Paratek shall pay CIPAN for all supplied quantities of conforming Crude Omadacycline within [***] from the date of invoice receipt. In this Agreement, unless expressly otherwise stated, all references to money or payments means US Dollars and all payments made hereunder shall be made in that currency. Notwithstanding anything to the contrary in this Agreement, pending resolution regarding any disagreement between the Parties as to conformance of a Product to the requirements of this Agreement or the Quality Agreement, Paratek is not obligated for any payment with respect to any Product Paratek believes to be non-conforming.

e. Exhibit A to the Agreement is hereby deleted in its entirety and replaced with Exhibit A attached to this Amendment.

2. **General Provisions**. Unless specifically modified or changed by the terms of the Amendment, all terms and conditions of the Agreement and the Quality Agreement, between the Parties, dated as of November 2, 2016 (as may be amended from time to time, "**Quality Agreement**") shall remain in full force and effect and shall apply fully as described and set forth in the Agreement and Quality Agreement, respectively. In the event of any express conflict or inconsistency between the Amendment, on one hand, and the Agreement or Quality Agreement on the other hand, the terms and conditions of the Amendment shall control. This Amendment, the Quality Agreement and the Agreement constitute the entire understanding among the parties regarding subject matters contained therein and herein and supersede all prior negotiations, commitments, agreements and understandings among them on such subject matters. This Amendment may be executed in any number of counterparts, either by original or facsimile counterpart, each such counterpart shall be deemed to be an original instrument, and all such counterparts together shall constitute but one agreement. This Amendment and all acts and transactions pursuant hereto and the rights and obligations of the parties hereto shall be governed, construed and interpreted in accordance with the law of [***], without regard to the conflict of laws principles thereof.

IN WITNESS WHEREOF, the duly authorized representatives of the Parties have executed this Amendment as of the Effective Date.

PARATEK PHARMACEUTICALS, INC.

By: /s/ Jason Burdette

Name: Jason Burdette

Title: Sr. Vice President of Technical Operations

CIPAN COMPANHIA INDUSTRIAL PRODUTORA DE ANTIBIÓTICOS, S.A.

By: /s/ Teresa Alves

Name: Teresa Alves

Title: CEO

THIS EXHIBIT HAS BEEN REDACTED AND IS THE SUBJECT OF A CONFIDENTIAL TREATMENT REQUEST. REDACTED MATERIAL IS MARKED WITH [***] AND HAS BEEN FILED SEPARATELY WITH THE SECURITIES AND EXCHANGE COMMISSION.

EXHIBIT A

Prices

[***]

[***]

[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]

[***]

[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]

THIS EXHIBIT HAS BEEN REDACTED AND IS THE SUBJECT OF A CONFIDENTIAL TREATMENT REQUEST. REDACTED MATERIAL IS MARKED WITH [***] AND HAS BEEN FILED SEPARATELY WITH THE SECURITIES AND EXCHANGE COMMISSION.

Execution Version

FIRST AMENDMENT OF OUTSOURCING SERVICES AGREEMENT

THIS FIRST AMENDMENT OF OUTSOURCING SERVICES AGREEMENT (the "Amendment") is made as of the 18th day of December, 2018 (the "Effective Date") by and between Paratek Pharmaceuticals, Inc., a company having a place of business at 75 Park Plaza, 4th Floor, Boston, MA 02116 ("Customer") and Carbogen AMCIS AG, a company having a place of business at Hauptstrasse 171, CH 4416 Bubendorf, Switzerland ("Supplier", collectively referred to herein with the Customer as the "Parties" and each, a "Party"). Capitalized terms used, but not otherwise defined, herein shall have the meanings set forth in the Agreement.

WHEREAS, Customer and Supplier are parties to that certain Outsourcing Services Agreement, dated December 30, 2016 (the "Agreement");

WHEREAS, the Parties now desire to amend the Agreement as set forth in this Amendment;

NOW THEREFORE, the Parties agree as follows:

1. **First Amendment to the Agreement**. The Agreement is amended and modified as of the Effective Date as follows:

TERM & TERMINATION

a. Section 2.1 is hereby amended and restated to read in its entirety as follows:

i. [***]

This Agreement shall commence on the Effective Date and shall be valid until the [***] (the "Initial Term"). Both Parties shall use reasonably diligent efforts to come to a subsequent long-term agreement, including good faith negotiations regarding minimum volume-based Product commitments from Customer to Supplier, no later than the [***] to replace this Agreement and serve as a long-term supply agreement between the Parties. Should the Parties have not agreed to the following agreement by the [***], this Agreement shall automatically renew for [***] (unless otherwise mutually agreed by the Parties or earlier terminated pursuant to Section 18.1) (each [***] renewal, a "Renewal Term").

b. Section 18.1(a) is hereby amended and restated to read in its entirety as follows:

i. a) Customer delivers written notice of termination to Supplier on or before [***], which termination shall be effective as of the expiration date of the Initial Term;

c. Section 18.1(b) is hereby amended and restated to read in its entirety as follows:

i. b) either Party delivers written notice of termination to the other Party, which termination shall be effective [***] from the date of such termination notice;

d. The introduction to Section 18.1(d) (i.e. the language before clause (i)) is hereby amended and restated to read in its entirety as follows:

i. d) a Party breaches a material provision of this Agreement (which, with respect to Supplier shall include, without limitation, a breach of Section 3.8, any material failure of supply under Section 6.5 (except in the event that Supplier's breach was caused by a failure of Customer to deliver Customer Materials to Supplier on the timeline required by this Agreement or to deliver Customer Materials that conform to the Customer Material Specifications at the time of delivery to Supplier) and any breach of Supplier's confidentiality and non-use obligations), and the other Party delivers written notice of termination to such breaching Party:

TITLE & DELIVERY

e. The following sentence shall be added to the end of Section 3.3(b):

i. Customer shall hold title to any Customer Materials used in the Manufacture of the Product and performance of Services hereunder by Supplier. For the avoidance of doubt, title to the Products shall remain with Supplier until [***] as set forth in Section 7.2(d).

f. Section 7.2(d) is hereby amended and restated to read in its entirety as follows:

i. The Products will be shipped [***]. All freight, applicable taxes (excluding any and all income taxes, employment taxes and the like incurred by Supplier), duties, express and delivery charges shall be for Customer's account and shall not be subject to discount. Upon [***], delivery shall be deemed completed at which time risk of loss or damage and title to the Products delivered shall pass to Customer.

ANNUAL PURCHASING REQUIREMENTS

g. Section 3.9 is hereby deleted is its entirety.

h. The third sentence of Section 3.12 is hereby deleted in its entirety.

i. The second sentence of Section 19.2 is hereby deleted in its entirety.

PURCHASE ORDERS

j. Section 6.1 is hereby amended and restated to read in its entirety as follows:

   i. Consistent with the Short Term Rolling Forecast as set forth in Section 4.1, Customer shall place with Supplier Purchase Orders, stating Customer's required delivery data, anticipated delivery schedule and the anticipated Fees, in accordance with the Fee Schedule set out in Exhibit C, for each delivery of Product to be made under this Agreement. Purchase Orders must have at least (i) [***] in the event Customer orders [***] or less in a calendar month set forth in the applicable Purchase Order or (ii) [***] in the event Customer orders more than [***] in a calendar month set forth in the applicable Purchase Order, of lead time before anticipated delivery to allow sufficient time for Supplier's planning, raw material purchases, production and release. Each Purchase Order shall constitute a firm, binding order, upon Supplier's acceptance thereof in accordance with Section 6.2.

k. The first paragraph of Section 6.4 is hereby amended and restated to read in its entirety as follows:

   i. In the event that Customer cancels all or part of a Purchase Order already accepted by Supplier, Supplier will use best efforts to reallocate capacity and mitigate any resultant costs of such cancellation. Except as expressly set forth in Section 3.4, Section 6.2, Section 6.3, Section 6.5 and Section 18.2(d), the following will be charged to Customer:

l. Section 6.4(b) is hereby amended and restated to read in its entirety as follows:

   i. [***]

m. Section 6.5 is hereby amended and restated to read in its entirety as follows:

   i. If Supplier, for any reason, fails to supply at least [***] of the units of Product ordered by Customer pursuant to valid Purchase Orders during any period of [***] or longer beginning on the requested delivery date, in addition to and without limiting any other remedies available to Customer, [***].

n. The first sentence of Section 3.1(b) is hereby amended and restated to read as follows:

   i. b) [***]

o. Section 3.1(c) is hereby amended and restated to read in its entirety as follows:

   i. [***]

p. Section 6.6 is hereby amended and restated to read in its entirety as follows:

i. From time-to-time during the Term, Customer may request that Supplier perform Services for Customer relating to the Product, for which Customer shall pay reasonable compensation to Supplier. In the event that Supplier is willing to perform any such Services requested by Customer, Supplier will first prepare a scope of work describing the Services to be performed and the costs to Customer for the approval of Customer (each a "Scope of Work"). No Services shall be commenced by Supplier unless (a) a Scope of Work relating to such Services has been agreed, executed and delivered by both Supplier and Customer; and (b) a Purchase Order has been issued by Customer and accepted by Supplier relating to such Services which Purchase Order references the specific Scope of Work and this Agreement. Customer shall have the right to terminate any Scope of Work and corresponding Purchase Order for Services at any time on reasonable advance written notice to Supplier (without terminating this Agreement), in which case Customer shall be responsible for:

1. [***]

2. [***]

BATCH SIZE

q. Any references to batch size of [***] for Product in the Agreement and Exhibit C attached thereto are hereby deleted and replaced with batch size of [***].

2. **General Provisions**. Unless specifically modified or changed by the terms of the Amendment, all terms and conditions of the Agreement and the Quality Agreement Relating to Contract Manufacturing Services between the Parties, dated as of December 22, 2016 (as amended from time to time, the "Quality Agreement") shall remain in full force and effect and shall apply fully as described and set forth in the Agreement and Quality Agreement, respectively. In the event of any express conflict or inconsistency between the Amendment, on one hand, and the Agreement or Quality Agreement on the other hand, the terms and conditions of the Amendment shall control. This Amendment, the Quality Agreement and the Agreement constitute the entire understanding among the parties regarding subject matters contained therein and herein and supersede all prior negotiations, commitments, agreements and understandings among them on such subject matters. This Amendment may be executed in any number of counterparts, either by original or facsimile counterpart, each such counterpart shall be deemed to be an original instrument, and all such counterparts together shall constitute but one agreement. This Amendment and all acts and transactions pursuant hereto and the rights and obligations of the parties hereto shall be governed, construed and interpreted in accordance with the laws of [***], without regard to the conflict of laws principles thereof.

THIS EXHIBIT HAS BEEN REDACTED AND IS THE SUBJECT OF A CONFIDENTIAL TREATMENT REQUEST. REDACTED MATERIAL IS MARKED WITH [***] AND HAS BEEN FILED SEPARATELY WITH THE SECURITIES AND EXCHANGE COMMISSION.

IN WITNESS WHEREOF, the duly authorized representatives of the Parties have executed this Amendment as of the Effective Date.

PARATEK PHARMACEUTICALS, INC.

By: /s/ Jason Burdette

Name: Jason Burdette

Title: VP, Technical Operations

CARBOGEN AMCIS AG

/s/ Dr. Thomas Hartmann

Senior Head of Key Account Services

CARBOGEN AMCIS AG

19 Dec 2018

By: /s/ Dr. Stefanie Quintes

Name: Dr. Stefanie Quintes

Title: Senior Head of Commercial Products

CARBOGEN AMCIS AG

19 Dec 2018

[*Signature Page to Amendment*]

Exhibit 21.1

Paratek Pharmaceuticals, Inc.

Subsidiaries

Paratek Bermuda Ltd.

Paratek Ireland Limited

Paratek Pharma, LLC

Paratek Royalty Corporation

Paratek Securities Corporation

Paratek UK Limited

Transcept Pharma, Inc.

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the following Registration Statements:

(1) Registration Statements (Form S-3 Nos. 333-215123 and 333-221843) of Paratek Pharmaceuticals, Inc.,
(2) Registration Statement (Form S-8 No. 333-135506) pertaining to the Novacea, Inc. 2006 Incentive Award Plan and the Amended 2001 Stock Option Plan of Novacea, Inc.,
(3) Registration Statement (Form S-8 No. 333-150869) pertaining to the Novacea, Inc. 2006 Incentive Award Plan,
(4) Registration Statement (Form S-8 Nos. 333-157927, 333-164468, 333-172041, 333-180517, 333-187254 and 333-194624) pertaining to the 2006 Incentive Award Plan of Transcept Pharmaceuticals, Inc.,
(5) Registration Statement (Form S-8 No. 333-160222) pertaining to the 2009 Employee Stock Purchase Plan of Transcept Pharmaceuticals, Inc.,
(6) Registration Statement (Form S-8 No. 333-201204) pertaining to the Paratek Pharmaceuticals, Inc. 2014 Equity Incentive Plan, as amended,
(7) Registration Statement (Form S-8 No. 333-205482) pertaining to the Paratek Pharmaceuticals, Inc. 2006 Incentive Award Plan, as amended and restated, the Paratek Pharmaceuticals, Inc. 2015 Equity Incentive Plan, and the Paratek Pharmaceuticals, Inc. 2015 Inducement Plan,
(8) Registration Statements (Form S-8 Nos. 333-210053, 333-217660, and 333-224781) pertaining to the Paratek Pharmaceuticals, Inc. 2015 Equity Incentive Plan,
(9) Registration Statement (Form S-8 Nos. 333-218847 and 333-228218) pertaining to the Paratek Pharmaceuticals, Inc. 2017 Inducement Plan, as amended, and
(10) Registration Statement (Form S-8 No. 333-226507) pertaining to the Paratek Pharmaceuticals, Inc. 2018 Employee Stock Purchase Plan,

of our reports dated March 5, 2019, with respect to the consolidated financial statements of Paratek Pharmaceuticals, Inc. and the effectiveness of internal control over financial reporting of Paratek Pharmaceuticals, Inc. included in this Annual Report (Form 10-K) of Paratek Pharmaceuticals, Inc. for the year ended December 31, 2018.

/s/ Ernst & Young LLP

Boston, Massachusetts
March 5, 2019

Exhibit 31.1

CERTIFICATION OF CHIEF EXECUTIVE OFFICER PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Michael F. Bigham, certify that:

1. I have reviewed this Annual Report on Form 10-K of Paratek Pharmaceuticals, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision; to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

/s/ MICHAEL F. BIGHAM

Michael F. Bigham
Chief Executive Officer
March 5, 2019

Exhibit 31.2

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Douglas W. Pagán, certify that:

1. I have reviewed this Annual Report on Form 10-K of Paratek Pharmaceuticals, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision; to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

/s/ DOUGLAS W. PAGAN

Douglas W. Pagán
Chief Financial Officer
March 5, 2019

Exhibit 32.1

CERTIFICATION OF CHIEF EXECUTIVE OFFICER PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

Pursuant to the requirement set forth in Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), and Section 1350 of Chapter 63 of Title 18 of the United States Code (18 U.S.C. §1350), Michael F. Bigham, Chief Executive Officer of Paratek Pharmaceuticals, Inc. (the "Company"), hereby certifies that, to the best of his knowledge:

1. The Company's Annual Report on Form 10-K for the year ended December 31, 2018 (the "Annual Report"), to which this Certification is attached as Exhibit 32.1 fully complies with the requirements of Section 13(a) or Section 15(d), of the Exchange Act; and

2. The information contained in the Annual Report fairly presents, in all material respects, the financial condition and results of operations the Company.

In Witness Whereof, the undersigned has set his hand hereto as of the 5th day of March, 2019.

/s/ MICHAEL F. BIGHAM

Michael F. Bigham
Chief Executive Officer

This certification accompanies the Annual Report on Form 10-K to which it relates, is not deemed filed with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of Paratek Pharmaceuticals, Inc. under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended (whether made before or after the date of this Annual Report on Form 10-K), irrespective of any general incorporation language contained in such filing.

Exhibit 32.2

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

Pursuant to the requirement set forth in Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), and Section 1350 of Chapter 63 of Title 18 of the United States Code (18 U.S.C. §1350), Douglas W. Pagán, Chief Financial Officer of Paratek Pharmaceuticals, Inc. (the "Company"), hereby certifies that, to the best of his knowledge:

1. The Company's Annual Report on Form 10-K for the year ended December 31, 2018 (the "Annual Report"), to which this Certification is attached as Exhibit 32.2 fully complies with the requirements of Section 13(a) or Section 15(d) of the Exchange Act; and

2. The information contained in the Annual Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

In Witness Whereof, the undersigned has set his hand hereto as of the 5th day of March, 2019.

/s/ DOUGLAS W. PAGAN

Douglas W. Pagán
Chief Financial Officer

This certification accompanies the Annual Report on Form 10-K to which it relates, is not deemed filed with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of Paratek Pharmaceuticals, Inc. under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended (whether made before or after the date of this Annual Report on Form 10-K), irrespective of any general incorporation language contained in such filing.