2017 Annual Report

novan®

From Kelly Martin, Chief Executive Officer

Over the course of 2017, we increased our work around the clinical application of the Company's underlying science: nitric oxide. The unique mechanistic properties of this technology provide the basis for broadening the activity across a multitude of dermatological indications.

Our expertise, hands-on experience, intellectual property creation and continuous analytic and formulation learnings about nitric oxide differentiate us from our competitors. Harnessing the advantages that derive from that distinction to create consequential advancement from a business platform point of view is at the core of our future strategy.

There were a number of key takeaways from 2017 that are instructive and warrant specific mention. Each provides important ingredients as to our near and intermediate term focus. They are:

Results from the Phase 3 pivotal trials for SB204 in acne vulgaris

- With one trial, we achieved statistical significance in all three co-primary endpoints (IGA score, inflammatory lesions and non-inflammatory lesions). In the other trial we achieved statistical significance in just one of the three co-primary endpoints.
- Internal resources and expert external advisors conducted a comprehensive review of the SB204 Phase 3 trials.
- After completing our analysis, we had a constructive guidance meeting with the FDA.
- As a result of our own analysis and on-going regulatory discussion, we announced agreement to a non-binding term sheet with a third party to move SB204 forward in acne. The exclusivity period expired in March 2018, but we have continued to collaborate with the third party, although the final business structure may differ from our previously announced expectations.
- The acne indication continues to be a core asset for the Company.
- We believe the potential for acne provides an attractive risk/reward opportunity for our stockholders.

Expansion of SB206 as a topical antiviral treatment for viral skin infections

- The antiviral application of nitric oxide is an important part of our strategic opportunity.
- In 2016, we announced that, in a Phase 2 trial, SB206 demonstrated statistically significant results in the clearance of external genital and perianal warts with a once-daily dose that was generally well-tolerated.
- The Phase 2 trial provided valuable learnings for nitric oxide in the antiviral space.
- A constructive end-of-Phase 2 meeting with the FDA was held mid-year in 2017.
- SB206 is currently positioned for Phase 3 pivotal trials in patients with external genital warts. We target future advancement of SB206 in this indication to occur through a strategic partnership.

Initiation of clinical development of SB414 for the treatment of inflammatory skin diseases

- SB414 for the treatment of inflammatory skin diseases represents the Company's first use of nitric oxide technology in the field of inflammation.
- We submitted an IND to the FDA with SB414 for the treatment of inflammatory skin diseases during the third quarter of 2017. Phase 1b clinical trials for the treatment of psoriasis and atopic dermatitis were initiated in the fourth quarter of 2017.

In sum, 2017 provided the Company with valuable clinical data and output that will become an important component of our decision making as we move forward. These learnings provide the basis for 2018 and beyond as we assess a broad array of dermatological opportunities. We believe that forward integrating the science into disease specific applications enables us to distribute the inherent drug development risk while, at the same time, creating the possibility of realizing a multitude of options to unlock and ultimately create stockholder value.

Importantly, and in addition to the advancement of the science, we took additional steps starting in 2017 to advance our Company's ability to execute on its strategy. First, we added three new directors to our Board – Paula Brown Stafford (Novan's Chief Development Officer), Machelle Sanders and Eugene Sun. These individuals bring a wealth of pharmaceutical development and manufacturing experience to the team.

We also strengthened our balance sheet through the completion of a $38 million public offering in early 2018. By strengthening the balance sheet, the Company, the investors and the market have been provided with a longer runway from which to execute our plan.

To our employees, I would acknowledge your efforts and commitment to moving the company forward. 2017 had both its challenges, as well as its progress. Our employees have certainly demonstrated their resilience and passion for the science and belief in the future.

To our Board of Directors, your guidance and involvement in our governance has been of immeasurable help to Novan and all of its constituencies. For that, I would like to personally thank you and acknowledge your collective leadership.

To our stockholders, we thank you for your input, patience and underlying belief in the uniqueness of the nitric oxide technology. We will continue to focus on progressing the platform in a manner that provides potential for upside value creation while balancing appropriate risk.

With thanks and commitment,
Kelly Martin
Chief Executive Officer

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

(Mark One)

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

For the fiscal year ended December 31, 2017

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934 For the transition period from to**

Commission file number 001-37880

Novan, Inc.

(Exact name of registrant as specified in its charter)

Delaware	**20-4427682**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
4105 Hopson Road Morrisville, North Carolina	**27560**
(Address of principal executive offices)	**(Zip Code)**

Registrant's telephone number, including area code: (919) 485-8080

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

Title of each class	**Name of each exchange on which registered**
Common Stock, $0.0001 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 and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ☒ No ☐

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405) 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, 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	☐ (Do not check if a small reporting company)	Small reporting company	☒
		Emerging growth company	☒

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

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

As of June 30, 2017, the last business day of the registrant's most recently completed second fiscal quarter, the aggregate market value of common stock held by non-affiliates of the registrant was approximately $47.0 million (based on a closing price of $4.03 per share as reported by the Nasdaq Global Market on June 30, 2017). For purposes of this calculation, shares of common stock beneficially owned by the registrant's officers, directors and certain stockholders as of June 30, 2017 have been excluded in that such persons may be deemed to be affiliates. This determination of affiliate status is not necessarily a conclusive determination for other purposes. The registrant has no non-voting common equity.

The number of shares of registrant's common stock outstanding as of March 23, 2018 was 26,038,742.

Portions of the registrant's proxy statement to be filed with the Securities and Exchange Commission pursuant to Regulation 14A in connection with the registrant's 2018 Annual Meeting of Stockholders, which will be filed subsequent to the date hereof, are incorporated by reference into Part III of this Form 10-K. Such proxy statement will be filed with the Securities and Exchange Commission not later than 120 days following the end of the registrant's fiscal year ended December 31, 2017.

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SPECIAL NOTE ABOUT FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K (this "Annual Report") contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the "Securities Act"), and Section 21E of the Securities Act of 1934, as amended (the "Exchange Act"), that involve substantial risks and uncertainties. All statements other than statements of historical facts contained in this Annual Report are forward-looking statements. These statements are often identified by the use of words such as "may," "will," "expect," "believe," "anticipate," "intend," "could," "should," "potential," "predict," "project," "estimate," or "continue" and similar expressions or variations.

These statements are based on the beliefs and assumptions of our management based on information currently available to management. Forward-looking statements involve known and unknown risks, uncertainties and other factors that may cause our actual results, levels of activity, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements. Factors that could cause or contribute to these differences include those set forth in the "Risk Factors" section of this Annual Report.

You should not rely upon forward-looking statements as predictions of future events. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee that the future results, levels of activity, performance or events and circumstances reflected in the forward-looking statements will be achieved or occur. Such forward-looking statements speak only as of the date of this Annual Report. Except as may be required by law, we undertake no obligation to update any forward-looking statements to reflect events or circumstances after the date of such statements.

PART I

Item 1. Business.

Overview

We are a clinical-stage biotechnology company focused on leveraging nitric oxide's natural antiviral and immunomodulatory mechanisms of action to treat dermatological and oncovirus-mediated diseases. Nitric oxide plays a vital role in the natural immune system response against microbial pathogens and is a critical regulator of inflammation. Our ability to harness nitric oxide and its multiple mechanisms of action has enabled us to create a platform with the potential to generate differentiated product candidates. The two key components of our nitric oxide platform are our proprietary Nitricil technology, which drives the creation of new chemical entities, or NCEs, and our topical formulation science, both of which we use to tune our product candidates for specific indications. We believe that the ability to deploy nitric oxide in a solid form, on demand and in localized formulations allows us the potential to improve patient outcomes in a variety of diseases.

Nitric oxide is one of the most researched molecules in human physiology and has been extensively studied in many areas of medicine including in microbial diseases and in the modulation of inflammation. The scarcity of nitric oxide-based therapeutic products is due to the challenges associated with controlling the release of a gas, the poor stability and low storage capacity of nitric oxide-loaded molecules, the inability to target specific tissues and the toxicity of several small molecules used as backbones to store nitric oxide.

The following key components of our nitric oxide platform fuel the creation of differentiated product candidates:

(1) **Novan's Nitricil technology** enables us to achieve stability for the chemical storage of large amounts of nitric oxide in solid form by loading it on an inert macromolecule, or polymer. The advantages of our proprietary Nitricil technology include tunability, stability, high storage capacity, targeted delivery and what we believe is an attractive safety profile. Our ability to select from several nitric oxide-loaded starting materials has created our proprietary library of Nitricil compositions, each of which possesses a unique nitric oxide release profile.

(2) **Our formulation science** enables us to further tune the release of nitric oxide when applied by using proprietary combinations of inactive ingredients. This additional level of control enables us to use one new chemical entity, or NCE, for multiple indications by altering the nitric oxide pharmacology with the composition of the topical formulation. This component of our nitric oxide platform creates an additional barrier to entry, which we believe positions us to prolong the period of market exclusivity for each of our product candidates. Our formulation approach and expertise allow us to customize the drug delivery method for the relevant anatomical location of a variety of diseases.

At present, our nitric oxide platform has produced a portfolio that includes the following clinical stage product candidates.

- SB204 is a once-daily, topical monotherapy being developed for the treatment of acne vulgaris, a multifactorial disease with multiple aspects of the disease pathology (anti-inflammatory and antibacterial) potentially treatable with SB204.
- SB206 is a topical antiviral gel being developed for the treatment of viral skin infections, with a current focus on the treatment of genital and perianal warts caused by *human papillomavirus*, or HPV, and molluscum contagiosum, a contagious skin infection caused by the *molluscipoxvirus*.
- SB208 is a topical broad-spectrum antifungal gel being developed for the treatment of fungal infections of the skin and nails, including athlete's foot (tinea pedis) and fungal nail infections (onychomycosis).
- SB414 is a topical cream-based product candidate being developed for the treatment of inflammatory skin diseases, with a current focus on the treatment of psoriasis and atopic dermatitis (eczema).

At present, we maintain exclusive, worldwide commercial rights for all product candidates currently in our pipeline, with the exception of the rights we licensed to Sato Pharmaceutical Co., Ltd., or Sato, in January 2017 to develop, use and sell SB204 in certain topical dosage forms in Japan for the treatment of acne vulgaris. We are also in

negotiations with a third party and intend to create a business structure that would enable further development and advancement of the SB204 program in the U.S. For additional information, please see the section entitled "Business—Our Product Candidates—SB204 for the Treatment of Acne Vulgaris".

The Novan Nitric Oxide Platform

Nitric oxide, or NO, is a two-atom molecule that is produced naturally by the human body. Since the Nobel Prize-winning discovery in 1998 that nitric oxide is responsible for regulating blood flow, or vasodilation, the effects of nitric oxide have been extensively studied in many areas of physiology.

As a fundamental component in host defense against invading organisms, cells of the immune system naturally generate nitric oxide using the enzyme nitric oxide synthase, or NOS, and the amino acid precursor L-arginine. Nitric oxide is released in a targeted manner to kill microbial pathogens, including bacteria, fungi and viruses. Nitric oxide and its metabolites drive cell death within bacteria and fungi by targeting metal centers or amino acids on proteins critical to sustaining microbial viability. In virally infected cells, nitric oxide inhibits viral replication by binding directly to free sulfurs or metals that are a part of key enzymes that can induce apoptosis, or programmed cell death, in cells where tumor suppressors have been degraded or disabled.

We believe that nitric oxide has potential to be a novel antimicrobial agent due to its multiple mechanisms of action and its ability as a gas to diffuse freely through cell membranes – unlike most other pharmaceutical agents. Importantly, the pharmacologic activity of nitric oxide is such that its production is localized at or near the site of infection. Because nitric oxide is a key component of the immune system's natural response to invading organisms, it may provide a therapeutic solution for degrading and killing microorganisms without the development of antimicrobial resistance.

Nitric oxide and its multiple mechanisms of action have wide ranging possibilities to treat human disease. We believe that our expertise at developing nitic oxide NCEs and fine tuning the formulation technology to the targeted disease separates us from other drug development companies focused in this space. Nitric oxide is a naturally occurring chemical in the human body, which enhances it safety profile. The proven antimicrobial and anti-inflammatory effects of nitric oxide, combined with its naturally strong safety profile and our ability to capture and deliver effective doses, positions Novan with the potential to bring multiple products to patients.

Limitations of Other Nitric Oxide-Based Approaches

Despite its therapeutic potential, there is currently only one use of nitric oxide approved by the U.S. Food and Drug Administration, or FDA, which is the use of nitric oxide gas for the treatment of pulmonary hypertension in neonatal infants. However, the delivery of nitric oxide from a gas tank is inconvenient and limits practical applications. The scarcity of nitric oxide-based products is due to the historical challenges associated with developing safe and effective approaches for the chemical storage and controlled release of a gas for therapeutic applications.

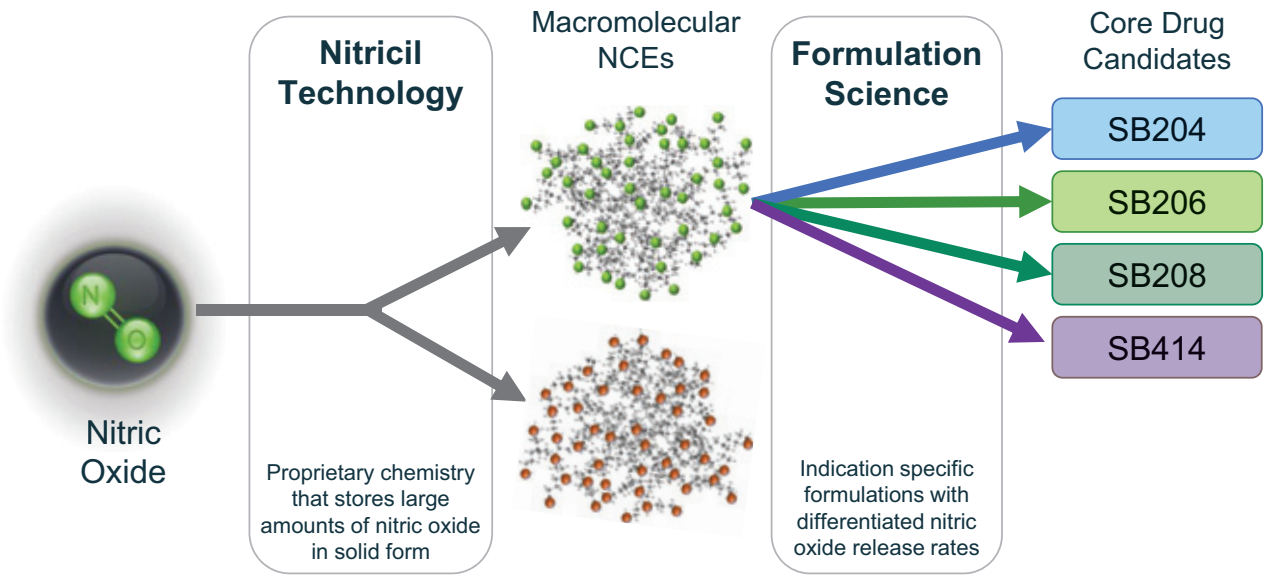
Advantages of Our Nitric Oxide Platform

We believe the Novan platform harnesses the potential of nitric oxide in a manner that leads to the creation of differentiated product candidates that address these limitations by (1) engineering tunable NCEs that store nitric oxide in solid form using our Nitricil technology and (2) using our formulation science to customize the drug delivery method for the anatomical location of a disease.

As shown in Figure 1 below, our Nitricil technology and formulation science are used in combination to effectively transform a useful, naturally occurring molecule into a therapeutic pipeline of product candidates.

Figure 1:

Our Nitric Oxide Platform

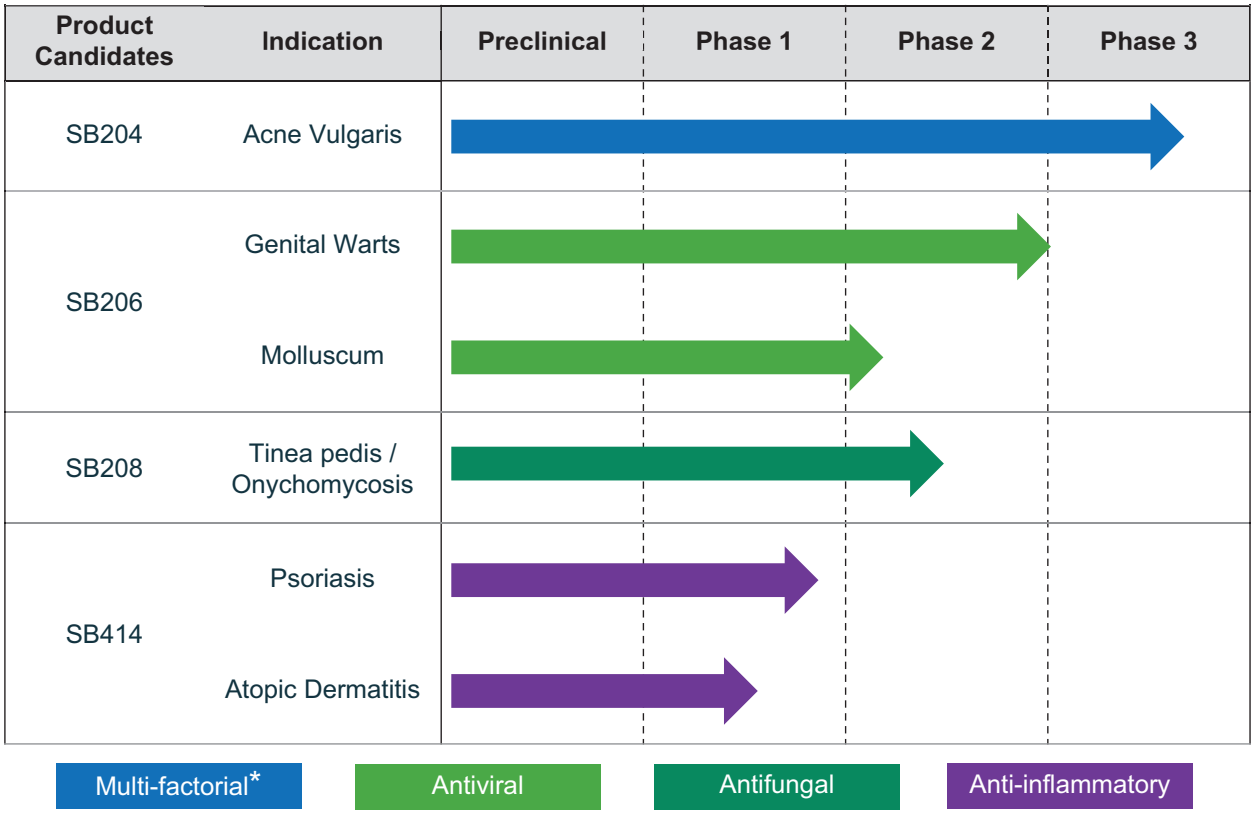


Our Product Candidates

We are advancing strategic development programs in the fields of dermatology and oncovirus-mediated disease. We have clinical-stage dermatology drug candidates with anti-acne (SB204) and antifungal (SB208) applications, which we intend to advance through partnerships, collaborations or other strategic relationships that we are currently exploring. We are utilizing our existing capital resources to fund the ongoing and near-term development activities in our antiviral (SB206) and anti-inflammatory (SB414) programs, as described in further detail below. Advancement of the SB206 and SB414 development programs beyond ongoing and near-term activities is dependent upon our ability to access additional capital from non-dilutive sources, including partnerships, collaborations, licensing, grants or other strategic relationships, or through equity or debt financings. Please refer to "Management's Discussion and Analysis of Financial Condition and Results of Operations—Liquidity and Capital Resources" for further discussion of our current liquidity and our future funding needs.

Our clinical-stage product candidate pipeline is currently positioned as described in Figure 2 below.

Figure 2:



* Includes anti-inflammatory and antibacterial activity – *P. acnes* in the case of SB204 for the treatment of acne.

SB204 for the Treatment of Acne Vulgaris

We are developing, SB204, as a once-daily, topical monotherapy for the treatment of acne vulgaris. Acne vulgaris is the most common skin condition in the U.S., affecting approximately 40 million to 50 million Americans annually. The disease ranges in severity from mild to severe cystic acne and causes both physical and psychological effects, including permanent scarring, anxiety, depression and poor self-esteem. Acne is a multifactorial disease with several mechanistic contributors to the disease pathology, often requiring treatments that address more than one of the major causes of acne pathogenesis. Localized nitric oxide delivery may provide anti-inflammatory and antibacterial activity from a single active ingredient.

We believe that acne continues to be characterized as an unmet medical need due to the difficulty of balancing efficacy, systemic safety and cutaneous tolerability, as well as the growing concerns with antibacterial resistance with existing therapies. In our more than 3,200 patient SB204 clinical development program, topical application of SB204 has been well-tolerated with no significant safety concerns identified. In maximal-use pharmacokinetic trials that we have conducted in adult and pediatric patients with acne vulgaris, we observed no detectable systemic exposure from SB204 following its topical application.

In the first quarter of 2017, we reported top-line results from two identically designed Phase 3 pivotal clinical trials for SB204. SB204 demonstrated statistical significance compared to vehicle on all three co-primary endpoints in one of the trials but demonstrated statistical significance on only one of three co-primary endpoints in the other trial. We conducted an in-depth examination of the full data sets from these trials, including post hoc analyses in pooled and sub populations, with extensive assistance from third-party expert consultants in biostatistics and regulatory affairs.

In mid-2017 we completed our 40-week long term safety trial in eligible patients with acne who had previously completed 12 weeks of treatment in the related Phase 3 pivotal trials of SB204. No serious adverse events were observed with over 400 patients followed for six months and over 200 patients followed for one year.

The information generated from the Phase 3 pivotal trials, the post hoc analyses and examinations as well as the long-term safety trial is fundamental to the advancement of the SB204 program through regulatory interactions and potential collaborative relationships described below.

- *January 2017*—We entered into a license agreement, and a related amendment, with Sato, or the Sato Agreement, whereby we licensed rights to develop, use, and sell SB204 in certain topical dosage forms in Japan for the treatment of acne vulgaris. The significant terms and the related accounting considerations of the Sato Agreement are further described in the "Licensing and Collaboration Arrangements" section below and in "Note 4—Collaboration Arrangements" to the accompanying consolidated financial statements included in this Annual Report on Form 10-K.
- *September 2017*—We held a productive guidance meeting with the FDA and obtained clinical and regulatory guidance around the SB204 program relative to the previously completed parallel Phase 3 pivotal trials in patients with moderate and severe acne.
- *November 2017*—We executed a non-binding term sheet with a third party to create a business structure that would enable further development and advancement of the SB204 program with an additional Phase 3 clinical trial. The business structure envisioned in the non-binding term sheet would access third-party financing and third-party execution of the additional clinical trial.
- *First Quarter of 2018*—Novan and the third party continue to evaluate and work towards finalization of the most appropriate design of one or more clinical trial(s) to maximize the probability of success. As part of this process, we are also examining all aspects of the acne field, including recent Phase 3 clinical trial failures in this therapeutic area. The next step requires additional FDA input and guidance that we expect to obtain during a Type C meeting scheduled in the second quarter of 2018. We believe further FDA input from the upcoming meeting will facilitate (i) finalization of our Phase 3 strategy and (ii) conclusion and execution of a definitive agreement with the third party.

  As outlined in the details of the November 2017 non-binding term sheet, the exclusivity period between ourselves and the third party expired in early March 2018. We continue to collaborate with the third party on all aspects of the Phase 3 program design and are actively working towards finalization of the definitive agreement. We are targeting these activities to be substantially complete prior to the upcoming FDA meeting so that SB204 can be advanced after the FDA's feedback is fully incorporated into the final Phase 3 strategy. The finalized third-party business structure may differ from what was envisioned in the non-binding term sheet due to the fluidity of the regulatory feedback, the continued assessment of the optimal strategy as well as the challenging set of co-primary efficacy endpoints. As a result, the business structure may include a blend of capital providers, including corporate and institutional investors. In addition, we may retain an option to participate in some portion of the funding. Both Novan and the third party continue to evaluate the optimal path forward for the asset and believe that feedback from the upcoming FDA meeting will help to provide clarity around that path.

  We intend to continue to evaluate various risk/benefit scenarios as we determine how to deploy capital for development in the acne space. We remain highly focused on managing the dynamic process of balancing the upside optionality and the near-term risk that accompanies the anticipated business structure. We target substantially completing a strategic arrangement, consistent with the expected timing for completion of our Phase 3 program design, so that the remaining components of the Phase 3 program could commence during the third quarter of 2018 if the parties agree that the risk/benefit assessment is appropriate to move forward.

SB206, a Topical Antiviral Treatment for Viral Skin Infections—

We are developing SB206 as a topical antiviral gel for the treatment of viral skin infections, with a current focus on genital and perianal warts caused by *human papillomavirus* and molluscum contagiosum, a contagious skin infection caused by the *molluscipoxvirus*.

External Genital Warts

Genital warts are among the world's most common sexually transmitted diseases. Genital warts are usually flesh-colored growths that can be raised, flat or cauliflower-shaped and are typically found on the surface of the external genitalia or in and around the anus. In males, they can appear on the surface of the penis and scrotum, and in females inside the vagina or on the cervix. Genital warts carry a substantial psychosocial burden due to the shame and embarrassment related to having a sexually transmitted disease as well as the inconvenience and discomfort of current treatment modalities. Current treatment options for genital warts consist of ablative procedures that cut, burn or freeze the warts but do not address the underlying viral infection, and there are no currently approved oral or topical prescription products indicated for the treatment of genital warts with a direct antiviral mechanism of action. Approximately 70% of patients treated for external genital warts receive locally destructive procedures, such as cryotherapy or curettage. Approximately 46% of patients are treated with prescription drugs alone or in combination with procedures. Both topical therapies and ablative procedures for genital warts remain largely ineffective in achieving long-term wart eradication and the average recurrence rates range from 30% to 70%. The approved drugs for the treatment of warts are pro-inflammatory in their mechanism of action and lead to ulcers, erosions and burning/stinging.

We initially evaluated SB206's antiviral activity in a Phase 2 randomized, double-blinded, vehicle-controlled clinical trial in 107 patients with genital warts caused by HPV. We announced top-line results from this Phase 2 clinical trial in the fourth quarter of 2016. SB206 demonstrated statistically significant results in the clearance of external genital and perianal warts. Once-daily treatment arms were generally well-tolerated, including the most effective dose, SB206 12% once-daily.

SB206 is currently positioned for Phase 3 pivotal trials in patients with external genital warts. We expect future advancement of SB206 in this indication to occur after the formation of a partnering relationship, which we are actively exploring, or another form of additional funding.

Molluscum Contagiosum

At the end-of-Phase 2 meeting for SB206 in the external genital warts indication, we also had a constructive discussion with the FDA regarding expansion of the SB206 program into the treatment of molluscum contagiosum. Molluscum is a contagious skin infection caused by the *molluscipoxvirus*. Molluscum affects approximately six million people in the U.S. annually. The greatest incidence is in children aged one to 14 years. The average time to resolution is 13 months, however, 13% of children experience lesions that may not resolve in 24 months. There is no FDA-approved treatment for molluscum. More than half of patients diagnosed with the infection are untreated. The majority of patients that receive treatment are treated with painful procedures and the remaining are often prescribed products indicated for the treatment of external genital warts.

We believe that observational learnings from an in-licensed topical nitric oxide technology study showing clinically meaningful complete clearance rates of baseline molluscum lesions, combined with our SB206 program knowledge, provide a logical pathway for SB206 development in the molluscum indication. We submitted an investigational new drug application, or IND, to the FDA in December 2017 and initiated a Phase 2 clinical trial utilizing SB206 for the treatment of molluscum in the first quarter of 2018 with top line results targeted in the fourth quarter of 2018. The Phase 2 multi-center, randomized, double-blind, vehicle-controlled, ascending dose clinical trial is designed to evaluate the efficacy, safety and tolerability of SB206 in 192 patients, with an option to increase to 256 patients, ages 2 and above, with molluscum. Patients will be treated with one of three concentrations of SB206 or vehicle for up to 12 weeks. The primary endpoint is the proportion of patients achieving complete clearance of all molluscum lesions at Week 12.

Potential Future Therapeutic Areas of Exploration

In addition to the aforementioned current focus areas for SB206, we are also evaluating potential development activities for SB206 and other NCEs for the treatment of HPV-associated sexually transmitted infections, or STIs, and high-risk neoplasias, including cervical and anal neoplasias caused by HPV-16 and HPV-18. Our acquisition of exclusive worldwide rights for certain oncovirus applications of nitric oxide-based products from KNOW Bio, LLC, or KNOW Bio, in October 2017 enables the potential expansion into this therapeutic area. The terms of this

intellectual property acquisition transaction are further described in "Note 4—Collaboration Arrangements" to the accompanying consolidated financial statements included in this Annual Report on Form 10-K.

SB208, a Topical Antifungal for the Treatment of Athlete's Foot (Tinea Pedis) and Fungal Nail Infections (Onychomycosis)

We are developing SB208 as a broad-spectrum antifungal gel for the treatment of superficial cutaneous fungal infections of the skin and nails, such as tinea pedis and onychomycosis. Recent studies suggest that both the nail plate, interdigital space and surrounding cutaneous tissue may serve as an overlooked reservoir of dermatophytes, perpetuating reinfection and coinfection of onychomycosis and tinea pedis. Additionally, studies have demonstrated enhanced efficacy when tinea pedis and onychomycosis are treated concurrently, suggesting that an effective topical treatment, suitable for simultaneous application to the nail plate and skin, may lead to lower rates of recurrence and enhanced efficacy.

Onychomycosis is a chronic fungal infection of the nails that affects approximately 40 million Americans and accounts for one-third of cutaneous fungal infections. The prevalence of disease increases with age, and more than 50% of patients are 70 years or older. The infection, caused by dermatophytes such as Trichophyton rubrum, often results in painful thickening and deformation of the nail and sometimes the separation of the nail plate from the nail bed, leading to an inability of the nail to perform its natural protective function. Oral therapies used to treat the infection are associated with severe side effects, and topical therapies have modest efficacy profiles with complete cure rates of less than 20%.

Tinea pedis, often referred to as Athlete's Foot, is a common fungal infection of the feet, affecting approximately 75 million Americans. Trichophyton rubrum is the most prominent dermatophyte in tinea pedis and also a causative pathogen in onychomycosis. Approximately one-third of onychomycosis patients also suffer from tinea pedis. Topical treatments are the first-line therapy for tinea pedis, while oral antifungals are prescribed when the infection is severe or the use of topical antifungals is not feasible. Currently, there is no approved single topical therapeutic agent that provides for the simultaneous treatment of the nail plate, bed, and surrounding cutaneous tissue.

In the ChubTur® infected human nail assay, a model utilized previously in the drug development of Kerydin® (tavaborole) Topical Solution, 5%, and Jublia® (efinaconazole) Topical Solution, 10%, nitric oxide-releasing formulations including SB208 demonstrated rapid penetration of the nail and effective fungal killing of Trichophyton rubrum in 24 hours following a single treatment application.

We conducted a Phase 2 proof-of-concept trial in patients with clinical signs and symptoms of tinea pedis and announced top-line results in the second quarter of 2017. SB208 demonstrated a statistically significant effect compared to vehicle in (i) the primary endpoint of achieving negative fungal culture at day 14 and (ii) the secondary endpoint of achieving mycological cure at the day 14 (mycological cure is defined by having a negative laboratory culture and negative fungal clinical diagnosis). At the end of a 4-week post treatment follow-up period, mycological cure was maintained at day 42 in both dose groups.

We are currently exploring potential partnerships, collaborations or other strategic relationships to further advance SB208.

SB414, a Topical Cream for the Treatment of Inflammatory Skin Diseases—

We are developing SB414 as a topical cream product candidate for the treatment of inflammatory skin diseases, such as psoriasis and atopic dermatitis. Inflammatory skin disorders are the results of immune system reactions that involve the skin. Biologic therapies are often used to treat patients with severe disease. A non-steroidal topical therapy that targets key inflammatory cytokines could address an unmet need for approximately 6 million psoriasis patients and approximately 14 million atopic dermatitis patients with less severe disease burden.

We submitted an IND with SB414 cream for the treatment of inflammatory skin diseases to the FDA during the third quarter of 2017.

Psoriasis

Psoriasis is a chronic inflammatory skin disease that affects approximately 7.5 million people in the United States. The disease is characterized by an errant immune-system response that drives inflammation and thickening of the skin caused by rapid turnover of skin cells. This typically results in patches of plaques, or thick, red raised skin with silvery-white scales. There is no cure for psoriasis. The healthcare market has seen an increase in the introduction of systemic therapies, including biologics, to treat patients with higher disease burden, but the current systemic therapies are indicated only for patients with moderate-to-severe disease. For the approximately 80% of patients with mild-to-moderate psoriasis, prescription treatment options include topical corticosteroids, retinoids and vitamin D3. Vitamin D3 is not efficacious enough as a monotherapy and topical corticosteroids and retinoids have well-known side effects and are not well suited for chronic use.

We have initiated clinical development of SB414, the Company's first use of our nitric oxide platform in the field of immunology by dosing the first patient in October 2017 in a Phase 1b clinical trial to evaluate SB414 in a cream for the treatment of psoriasis. The purpose of the Phase 1b trial is to evaluate safety and to assess target engagement through a reduction of key pro-inflammatory biomarkers like interleukin-17, or IL-17, before progressing to Phase 2 clinical trials. According to a recent peer-reviewed article in the British Journal of Dermatology, IL-17 is known to be or is likely to be related to the mechanism and severity of a number of inflammatory skin disorders, including psoriasis, acne, atopic dermatitis, rosacea and alopecia areata. Earlier in 2017, we presented mechanistic evidence for SB414, demonstrating a statistically significant reduction in composite psoriasis scores and an inhibition of IL-17a and IL-17f in an animal model. Top line results for the Phase 1b trial are targeted in the second quarter of 2018.

Atopic Dermatitis

Atopic dermatitis, also known as atopic eczema, is the most common chronic relapsing inflammatory skin disease, affecting nearly 18 million people in the United States with no FDA-approved cure. Stabilizing the disease and reducing the number and severity of flares are the primary goals of current treatment options. The disease is characterized by recurrent red plaques, intense itching, dry skin with red papules and plaques, "weeping" clear fluid, crust and scaling. Immune cells in the deep layers of skin release inflammatory signals, causing an itchy rash. Scratching leads to defects in the skin barrier function, allowing environmental triggers, such as the bacteria Staphylococcus aureus, to penetrate the skin barrier and further exacerbate the immune cells. A recent study showed that the entry of S. aureus into the dermis triggers immune abnormalities seen in atopic dermatitis skin. Nearly 80% of the atopic dermatitis population suffers from mild-to-moderate disease and is treated with first-line monotherapies, such as corticosteroids and calcineurin inhibitors, however, corticosteroids and calcineruin inhibitors have side effects and are not well-suited for chronic use. Recently, the first biologic treatment for atopic dermatitis targeting interleukin-4, or IL-4, and IL-13 was approved, but it is reserved for patients with moderate to severe disease. Additionally, a topical PDE4 inhibitor was recently approved after more than a decade absent of any new mechanisms of action.

In two in vivo models that assess critical components of atopic dermatitis disease pathology, SB414 displayed potent anti-staphylococcal activity and dose-dependent inhibition of inflammation comparable to betamethasone, a mid-potency corticosteroid used to treat patients with atopic dermatitis. Based on preclinical data generated to date and documented literature on nitric oxide's mechanisms of action, we believe that SB414 cream has the potential to offer non-steroidal, immunomodulatory activity and anti-staphylococcal activity for the treatment of atopic dermatitis. Additionally, SB414 cream is an occlusive formulation allowing for pH control in the skin and a possible reduction in trans-epidermal water loss, both important factors for treating the disease.

We initiated a Phase 1b trial with SB414 in adults with mild-to-moderate atopic dermatitis in December 2017. The Phase 1b trial is being conducted in 48 adults with mild-to-moderate atopic dermatitis with up to 30% body surface area at baseline. Two concentrations of SB414 and vehicle cream, applied twice-daily for two weeks, are being evaluated for safety, for systemic exposure and to assess target engagement through a reduction of key pro-inflammatory biomarkers such as IL-4 before progressing to Phase 2 clinical trials. Eczema area severity index (EASI) scores are also being recorded at baseline and at the end of treatment. Top line results are targeted for the third quarter of 2018.

After the completion of both Phase 1b trials in psoriasis and atopic dermatitis, we expect to evaluate the results comprehensively during the second half of 2018 and then determine the appropriate developmental next steps for SB414.

Competition

The biotechnology and pharmaceutical industries are characterized by rapidly advancing technologies, intense competition and a strong emphasis on proprietary products. We consider our primary potential competition to be a broad base of existing providers and drug developers of therapeutics to treat acne vulgaris, genital warts, onychomycosis, psoriasis and atopic dermatitis. Product competition includes over the counter products, or OTC, pharmaceutical generics, branded generics, pharmaceutical brands as well as biologics. We expect continued future competition across research and drug development in various different fields of innovation; capital and resource allocation to many of these areas appears to be continuous and of a global nature. In addition, there are certain instances where competition extends into the medical procedure and the medical device spectrums of human health care. Any product candidates that we successfully develop and commercialize will compete with these existing therapies as well as new therapies that may become available in the future. Our success will be based in part on our ability to identify, develop and manage a portfolio of product candidates that are safer and more effective than competing products and therapies.

Intellectual Property

Our success depends in large part upon our ability to obtain and maintain proprietary protection for our products and technologies and to operate without infringing the proprietary rights of others. We seek to avoid the latter by monitoring patents and publications that may affect our business, and to the extent we identify such developments, evaluating and taking appropriate courses of action. With respect to the former, our policy is to protect our proprietary position by, among other methods, filing for patent applications on inventions that are important to the development and conduct of our business with the U.S. Patent and Trademark Office, or USPTO, and its foreign counterparts. We also use other forms of protection, such as trademark, copyright and trade secret protection, to protect our intellectual property, particularly where we do not believe patent protection is appropriate or obtainable.

We own or have an exclusive license to issued patents and pending patent applications in the United States and in foreign jurisdictions (including applications filed in foreign jurisdictions and international or Patent Cooperation Treaty, or PCT, applications that have not yet entered national phase). Patent coverage lasts for varying periods according to the date of filing of the patent application or the date of grant or issuance of the patent and the legal term of patents in various countries where patent protection is obtained. Generally, patents issued for regularly filed applications in the United States are granted a term of 20 years from the earliest filing date of a non-provisional patent application. In addition, in certain instances, the term of a patent can be extended to recapture a portion of the USPTO delay in issuing the patent or may be shortened if a patent is terminally disclaimed over another patent that expires earlier. The term of a patent may also be eligible for patent term extension to recapture a portion of the term effectively lost as a result of the FDA regulatory review period. However, as to the FDA component, the extension term cannot be longer than five years and the total patent term including the restoration period must not exceed 14 years following FDA approval. The duration of foreign patents varies in accordance with provisions of applicable local law, but typically is also 20 years from the earliest filing date of a non-provisional patent application. However, the actual protection afforded by a patent varies on a product by product basis from country to country and depends upon many factors, including the type of patent, the scope of its coverage, the availability of regulatory-related extensions, the availability of legal remedies in a particular country and the validity and enforceability of the patent.

Nitricil Technology

We exclusively license from UNC issued patents and pending applications directed to our library of Nitricil compounds, including patents issued in the United States, Canada, Japan and Australia with claims intended to cover NVN1000, the NCE for our current clinical-stage product candidates. Additionally, one such issued patent in the United States has claims specifically directed to the composition of matter of NVN1000. These patents and pending applications, if issued, are projected to expire in 2026 without taking into account any patent term extensions that may be available to us. Additionally, NVN1000 has been classified as an NCE, and patent term extensions may be

available to extend the life of a U.S. patent that covers NVN1000 beyond 2026. We also own patents issued in the United States, China, Germany, Spain, France, Great Britain, Ireland, Italy and Switzerland directed to methods of manufacturing Nitricil compounds. These patents are projected to expire in 2032.

Formulation Science and Therapeutic Uses

We own patents issued in the United States, Australia, Germany, Spain, France, Great Britain, Italy, China, Mexico and Japan and pending applications filed in foreign jurisdictions, including Brazil, Canada, Europe and South Korea directed to methods of reducing sebum production using nitric oxide-releasing macromolecules, including, in certain embodiments, through the use of Nitricil compounds. We also own issued U.S. patents and pending applications filed in the United States, Australia, Brazil, Canada, China, Europe and Japan directed to the alcohol gel component of SB204 and SB206 and/or the SB204 and SB206 two-component formulations. We are pursuing United States, Australia, Brazil, Canada, China, Europe, Japan, South Korea and PCT applications directed to the use of nitric oxide-releasing compounds, including, in certain embodiments, Nitricil compounds, for the treatment of viral skin infections.

Altogether, our issued U.S. and foreign patents and pending U.S. and foreign patent applications, if issued, relating to one or more of our clinical-stage product candidates are projected to expire between 2026 and 2037, without taking into account any patent term extensions that may be available to us and assuming that prosecution is pursued to issuance with no shortening of term.

Other Patented Technology

In addition to the patents and pending applications we own or have an exclusive license related to Nitricil and our product candidates, we also own or have exclusive licenses to issued patents and pending applications in the United States and in foreign jurisdictions covering other nitric oxide-based therapeutics and methods of use in indications for dermatological and oncovirus-mediated diseases.

Trade Secrets

We rely upon trade secrets and know-how and continuing technological innovation to develop and maintain our competitive position. We seek to protect our proprietary information, in part, by requiring our employees, consultants, contractors and other advisors to execute nondisclosure and assignment of invention agreements, or to include such provisions in their consulting agreement, upon commencement of their respective employment or engagement. These agreements are designed to protect our proprietary information and, in the case of the invention assignment agreements and provisions, to grant us ownership of technologies that are developed through a relationship with a third party. These agreements may be breached, and we may not have adequate remedies for any breach. In addition, our trade secrets may otherwise become known or be independently discovered by competitors. To the extent that our commercial partners, collaborators, employees and consultants use intellectual property owned by others in their work for us, disputes may arise as to the rights in related or resulting know-how and inventions.

Trademarks

Novan® is a registered trademark of our company in the United States.

Collaboration and Licensing Agreements

UNC License Agreement

We acquired exclusive rights to our library of Nitricil compounds pursuant to license agreements with UNC entered into in July 2007 and October 2009, which were subsequently amended, restated and consolidated in June 2012. We amended the consolidated license agreement in November 2012 to expand the scope of licensed patents to cover additional nitric oxide technologies in consideration for an upfront cash payment. We may obtain similar amendments to the consolidated license agreement to expand the scope of licensed patents to cover future additional nitric oxide technologies or as improvements on licensed technology and, if such amendments were executed, we

may be required to pay additional upfront cash payments. In April 2016, we amended the agreement to clarify the scope of the intellectual property of the consolidated license agreement.

Under the consolidated license agreement with UNC, we are granted an exclusive, worldwide license, with the ability to sublicense, under the licensed UNC patents, including those directed to Nitricil compounds, to develop and commercialize products utilizing the licensed technology. As partial consideration for the consolidated license agreement, we issued 191,052 shares of our common stock to UNC and a nominal upfront cash payment. Additionally, under the consolidated license agreement, we are obligated to pay UNC a running royalty percentage in the low single digits on net sales of licensed products (by us or any of our sublicensees, such as Sato), and to pay up to $425,000 to UNC in regulatory and commercial milestones on a licensed product by licensed product basis.

Under the consolidated license agreement, UNC controls prosecution activities with respect to licensed patents owned solely by UNC, we control prosecution activities with respect to licensed patents jointly owned by us and UNC and we are obligated to reimburse UNC for reasonable prosecution and maintenance costs. Pursuant to the consolidated license agreement, we have the first right to defend against third-party claims of patent infringement with respect to the licensed products and to enforce the licensed patents against third-party infringers.

Unless earlier terminated by us at our election, or if we materially breach the agreement or becomes bankrupt, the consolidated license agreement remains in effect on a country by country and licensed product by licensed product basis until the expiration of the last to expire issued patent covering such licensed product in the applicable country, and upon such expiration, we receive a perpetual, unrestricted, fully-paid and royalty free right to develop and commercialize such licensed product in such country. As of December 31, 2017, the last to expire issued patent licensed to us under the consolidated license agreement is projected to expire in 2033. UNC may terminate the agreement or render the license granted thereunder non-exclusive for our material breach of the agreement that remains uncured after 90 days of receipt of written notice thereof from UNC and may also terminate the agreement or render the license granted thereunder non-exclusive upon providing written notice for our bankruptcy or insolvency-related events within 30 days of the occurrence of such events. We may terminate the agreement at any time for convenience upon providing written notice of not less than 30 days to UNC.

Separation Transaction and Licensing Arrangements with KNOW Bio, including Amendments

2015 Separation Transaction and Licensing Arrangements

In connection with the December 2015 separation of our non-dermatology assets to KNOW Bio, we granted to KNOW Bio, through two separate agreements, exclusive licenses, with the right to sublicense, to certain U.S. and foreign patents and patent applications controlled by us as of the execution date of the agreement, and, under one of the agreements, patents and patent applications which may become controlled by us during the three years immediately following the execution date of such agreement, directed towards nitric oxide-releasing compositions and methods of manufacturing thereof, including methods of manufacturing Nitricil compounds, and other nitric oxide-based therapeutics. Under the exclusive license, KNOW Bio has the right to develop and commercialize products utilizing the licensed technology (excluding products containing certain particles, including NVN1000) in all fields of use except generally for the diagnosis, treatment, prevention, and palliation of diseases, conditions, or disorders of the skin, nails, hair or scalp in humans or animals, and all cosmetic uses for the skin, nails, hair or scalp, other than (i) for wound care through formulations of therapeutic product specifically designed to treat chronic wounds, thermal burns, radiation injury, accidental injury, surgical sites or scars, and (ii) therapeutic uses for treating cancer, excluding basal cell carcinoma, squamous cell carcinoma, precancerous conditions of the skin, actinic keratosis, actinic cheilitis, cutaneous horn, Bowen disease, radiation dermatosis, and dysplastic nevi, or the KNOW Bio Field.

Under one of these exclusive license agreements, KNOW Bio granted to us an exclusive license, with the right to sublicense, under any patents and patent applications which may become controlled by KNOW Bio during the three years immediately following the execution date of such agreement and directed towards nitric oxide-releasing compositions and methods of manufacturing thereof, including methods of manufacturing Nitricil compounds, and other nitric oxide-based therapeutics, but not towards medical devices, for use in the diagnosis, treatment, prevention, and palliation of diseases, conditions, or disorders of the skin, nails, hair or scalp in humans or animals, and all cosmetic uses for the skin, nails, hair or scalp, other than (i) for wound care through formulations of

therapeutic product specifically designed to treat chronic wounds, thermal burns, radiation injury, accidental injury, surgical sites or scars, and (ii) therapeutic uses for treating cancer, excluding basal cell carcinoma, squamous cell carcinoma, precancerous conditions of the skin, actinic keratosis, actinic cheilitis, cutaneous horn, Bowen disease, radiation dermatosis, and dysplastic nevi, or the Retained Dermatology Field, including but not limited to SB204, SB206, SB208, SB414 and our other presently-contemplated pipeline candidates. KNOW Bio granted us a right of first negotiation to obtain a license under any patents and patent applications generated by KNOW Bio during the first three years following the execution date of the agreement and directed towards medical devices to develop and commercialize licensed products in the Retained Dermatology Field. Additionally, Novan and KNOW Bio also agreed that neither party will commercialize any products in the other's field of use during December 2015 through December 2018. Neither we nor, to our knowledge, KNOW Bio has commercialized or expects to commercialize a product in the other party's field during this period.

Additionally, we granted to KNOW Bio exclusive sublicenses, with the ability to further sublicense, under certain of the U.S. and foreign patents and patent applications exclusively licensed to us from UNC and another third party directed towards nitric oxide-releasing compositions, including certain Nitricil compounds, to develop and commercialize products utilizing the licensed technology in the KNOW Bio Field. Under the exclusive sublicense to the UNC patents and applications, KNOW Bio is subject to the terms and conditions under the consolidated license agreement with UNC, including diligence obligations and milestone payment obligations.

Under the exclusive license agreements and sublicense agreements, we retain all rights under our owned and exclusively licensed patents and patent applications with respect to development and commercialization of products for use in the Retained Dermatology Field. The exclusive license agreements and sublicense agreements will continue for so long as there is a valid patent claim under the respective agreement, unless earlier terminated, and upon expiration continues as a perpetual non-exclusive license. Under each agreement, Novan and KNOW Bio have the right to terminate the agreement by subsequent written notice for the other party's material breach which remains uncured within 30 days of receipt of notice thereof. Novan also has the right to terminate each such agreement immediately upon written notice if KNOW Bio, its affiliates or sublicensees challenge the validity of any patent licensed in such agreement. KNOW Bio has the right to terminate each such agreement, with notice, for any reason upon ninety days advance written notice to the Company. The licenses granted by KNOW Bio to the Company in the agreements survive termination of the agreements.

For additional information about the Separation Transaction, please see the "Note 4—Collaboration Arrangements" to the accompanying consolidated financial statements in Item 8 of this Annual Report on Form 10-K

2017 Amendments to KNOW Bio Licensing Arrangements

In October 2017, we entered into certain amendments, or the KNOW Bio Amendments, to the original license and sublicense agreements described above between us and KNOW Bio, or the Original KNOW Bio Agreements, described above. Pursuant to the terms of the KNOW Bio Amendments, we re-acquired from KNOW Bio exclusive, worldwide rights under certain U.S. and foreign patents and patent applications controlled by us as of the execution date of the Original KNOW Bio Agreements, and patents and patent applications which may become controlled by us during the three years immediately following the execution date of the Original KNOW Bio Agreements, directed towards nitric oxide-releasing compositions and methods of manufacturing thereof, including methods of manufacturing Nitricil compounds, and other nitric oxide-based therapeutics, to develop and commercialize products for all diagnostic, therapeutic, prophylactic and palliative uses for any disease, condition or disorder caused by certain oncoviruses, or the Oncovirus Field. KNOW Bio also granted to us an exclusive license, with the right to sublicense, under any patents and patent applications which may become controlled by KNOW Bio during the three years immediately following the execution date of the Original KNOW Bio Agreements and directed towards nitric oxide-releasing compositions and methods of manufacturing thereof, including methods of manufacturing Nitricil compounds, and other nitric oxide-based therapeutics, but not towards medical devices, to develop and commercialize products for use in the Oncovirus Field. Additionally, KNOW Bio agreed that KNOW Bio will not commercialize any products in the Oncovirus Field during the first three years following the execution date of the Original KNOW Bio Agreements.

The rights granted to us in the Oncovirus Field in the KNOW Bio Amendments continue for so long as there is a valid patent claim under the Agreements, and upon expiration continue on a perpetual non-exclusive basis, and are

subject to the termination rights of KNOW Bio and us that are set forth in the Original KNOW Bio Agreements. In addition, under the KNOW Bio Amendments, KNOW Bio may terminate the rights granted to us in the Oncovirus Field if: (i) we do not file a first IND application with the FDA for a product in the Oncovirus Field by October 2020; or (ii) we do not file a first NDA with the FDA by October 2025 for a product in the Oncovirus Field and do not otherwise have any active clinical programs related to the Oncovirus Field at such time.

Additional terms, including our financial obligations, under the KNOW Bio Amendments are described in further detail in "Note 4—Collaboration Arrangements" to the accompanying consolidated financial statements included in this Annual Report on Form 10-K.

Sato License Agreement

On January 12, 2017, we entered into a license agreement, and related amendment, with Sato relating to SB204, for the treatment of acne vulgaris in Japan, or the Sato Agreement. Pursuant to the Agreement, we granted to Sato an exclusive, royalty-bearing, non-transferable license under certain of our intellectual property rights, with the right to sublicense with our prior written consent, to develop, use and sell products in Japan that incorporate SB204 in certain topical dosage forms for the treatment of acne vulgaris, and to make the finished form of such products. We will also supply finished product for use in development of SB204 in the licensed territory. The rights granted to Sato do not include the right to manufacture the active pharmaceutical ingredient, or API, of SB204; rather, the parties agreed to negotiate a commercial supply agreement pursuant to which we or a third party contract manufacturer would be the exclusive supplier to Sato of the API for the commercial manufacture of licensed products in the licensed territory. Pursuant to the terms of the Sato Agreement, Sato had an exclusive option to negotiate for the license rights in certain additional territories within Asia, subject to Sato's payment of a specified option exercise fee. During the third quarter of 2017, Sato elected not to execute this option and, as a result, the option expired unexercised. Under the terms of the Sato Agreement, we also have exclusive rights to certain intellectual property that may be developed by Sato in the future, which we may choose to use for our own development and commercialization of SB204 outside of Japan.

The term of the Sato Agreement (and the period during which Sato must pay royalties under the Sato Agreement) expires, on a licensed product-by-licensed product basis, on the tenth anniversary of the first commercial sale of a licensed product in the licensed field in the licensed territory.

For additional information about the Sato Agreement, please see the sections titled "Management's Discussion and Analysis of Financial Condition and Results of Operations—Corporate Updates" and "Note 4—Collaboration Arrangements" of the accompanying financial statements.

Government Regulation

The FDA and comparable regulatory authorities in state and local jurisdictions and in other countries impose substantial and burdensome requirements upon companies involved in the clinical development, manufacture, marketing and distribution of drugs, such as those we are developing. These agencies and other federal, state and local entities regulate, among other things, the research and development, testing, manufacture, quality control, safety, effectiveness, labeling, storage, record keeping, approval, advertising and promotion, distribution, post-approval monitoring and reporting, sampling and export and import of our product candidates.

U.S. Government Regulation

In the United States, the FDA regulates drugs under the Federal Food, Drug, and Cosmetic Act, or FDCA, and its implementing regulations. The process of obtaining regulatory approvals and the subsequent compliance with applicable federal, state, local and foreign statutes and regulations requires the expenditure of substantial time and financial resources. Failure to comply with the applicable U.S. requirements at any time during the product development process, approval process or after approval, may subject an applicant to a variety of administrative or judicial sanctions, such as the FDA's refusal to approve pending NDAs, withdrawal of an approval, imposition of a clinical hold, issuance of warning letters, product recalls, product seizures, total or partial suspension of production

or distribution, injunctions, fines, refusals of government contracts, restitution, disgorgement or civil or criminal penalties.

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 in compliance with the FDA's GLP regulations;
- submission to the FDA of an IND which must become effective before human clinical trials may begin;
- approval by an independent Institutional Review Board, or IRB, at each clinical site before each trial may be initiated;
- performance of adequate and well-controlled human clinical trials in accordance with good clinical practice, or GCP, requirements to establish the safety and efficacy of the proposed drug product for each indication;
- submission to the FDA of an NDA after completion of all pivotal clinical trials;
- satisfactory completion of an FDA advisory committee review, if applicable;
- satisfactory completion of an FDA inspection of the manufacturing facility or facilities at which the product is produced to assess compliance with current good manufacturing practice, or cGMP, requirements and to assure that the facilities, methods and controls are adequate to preserve the drug's identity, strength, quality and purity; and
- FDA review and approval of the NDA to permit marketing of the product for particular indications for uses in the United States.

Preclinical Studies

Preclinical studies include laboratory evaluation of product chemistry, toxicity and formulation, as well as animal studies to assess potential safety and efficacy. An IND sponsor must submit the results of the preclinical tests, together with manufacturing information, analytical data and any available clinical data or literature, among other things, to the FDA as part of an IND. Some preclinical testing may continue even after the IND is submitted. An IND automatically becomes effective 30 days after receipt by the FDA, unless before that time the FDA raises concerns or questions related to one or more proposed clinical trials and places the clinical trial on a clinical hold. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical trial can begin. As a result, submission of an IND may not result in the FDA allowing clinical trials to commence.

Clinical Trials

Clinical trials involve the administration of the IND to human patients under the supervision of qualified investigators in accordance with GCP requirements, which include the requirement that all research subjects provide their informed consent in writing for their participation in any clinical trial. Clinical trials are conducted under protocols detailing, among other things, the objectives of the trial, the parameters to be used in monitoring safety and the effectiveness criteria to be evaluated. A protocol for each clinical trial and any subsequent protocol amendments must be submitted to the FDA as part of the IND submission. In addition, an IRB at each institution participating in the clinical trial must review and approve the plan for any clinical trial before it commences at that institution. Information about certain clinical trials must be submitted within specific timeframes to the National Institutes of Health, or NIH, for public dissemination on their www.clinicaltrials.gov website.

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

- Phase 1 clinical trial: The drug is initially introduced into healthy human subjects or patients with the target disease or condition and tested for safety, dosage tolerance, absorption, metabolism, distribution, excretion and, if possible, to gain an early indication of its effectiveness.

- Phase 2 clinical trial: The drug is administered to a limited patient population 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: The drug is administered to an expanded patient population, generally at geographically dispersed clinical trial sites, in well-controlled clinical trials to generate enough data to statistically evaluate the efficacy and safety of the product for approval, to establish the overall risk-benefit profile of the product and to provide adequate information for the labeling of the product.
- Phase 4 clinical trials: In some cases, the FDA may require, or companies may voluntarily pursue, additional clinical trials after a product is approved to gain more information about the product. In some cases, these Phase 4 studies are made a condition of approval of the NDA.

Progress reports detailing the results of the clinical trials must be submitted at least annually to the FDA, and more frequently if serious adverse events occur. Each of Phase 1, Phase 2 and Phase 3 clinical trials may not be completed successfully within any specified period, or at all. Clinical trials may be delayed for a variety of reasons including unexpected safety or efficacy concerns, slow enrollment of subjects, unexpected shortages in the drug product, or other reasons. Furthermore, the FDA or the sponsor may suspend or terminate a clinical trial at any time on various grounds, including a finding that the research 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.

Special Protocol Assessment

The SPA process is designed to facilitate the FDA's review and approval of drugs by allowing the FDA to evaluate, among other things, the proposed design and size of Phase 3 clinical trials that are intended to form the primary basis for determining a drug's efficacy. Upon specific request by a clinical trial sponsor, the FDA will evaluate the protocol and respond to a sponsor's questions regarding, among other things, primary efficacy endpoints, trial conduct and data analysis. The FDA aims to complete SPA reviews within 45 days of receipt of the request.

The FDA ultimately assesses whether the protocol design and planned analysis of the trial are acceptable to support regulatory approval of the product candidate with respect to effectiveness of the indication studied. All agreements and disagreements between the FDA and the sponsor regarding an SPA must be clearly documented in an SPA letter or the minutes of a meeting between the sponsor and the FDA.

Even if the FDA agrees to the design, execution and analyses proposed in protocols reviewed under the SPA process, the FDA may revoke or alter its agreement under the following circumstances:

- public health concerns emerge that were unrecognized at the time of the protocol assessment, or the director of the review division determines that a substantial scientific issue essential to determining safety or efficacy has been identified after testing has begun;
- a sponsor fails to follow a protocol that was agreed upon with the FDA; or
- the relevant data, assumptions or information provided by the sponsor in a request for SPA change are found to be false statements or misstatements or are found to omit relevant facts.

A documented SPA may be modified, and such modification will be deemed binding on the FDA review division, except under the circumstances described above, if the FDA and the sponsor agree in writing to modify the protocol and if generally such modification is intended to improve the study.

Marketing Approval

Assuming successful completion of the required testing in accordance with all applicable regulatory requirements, the results of the preclinical studies and clinical trials, together with detailed information relating to the product's chemistry, manufacture, controls and proposed labeling, among other things, are submitted to the FDA as part of an NDA requesting approval to market the product for one or more indications for use. In most cases, the submission of an NDA is subject to a substantial application user fee. Under the Prescription Drug User Fee Act, or PDUFA,

guidelines that are currently in effect, the FDA has a goal of ten months from the date of "filing" of a standard NDA for a new molecular entity to review and act on the submission. This review typically takes twelve months from the date the NDA is submitted to FDA because the FDA has approximately two months to make a "filing" decision as to whether it will accept the application for filing. The actual review time may be significantly longer, depending on the complexity of the review, FDA requests for additional information and the sponsor's submission of additional information.

In addition, under the Pediatric Research Equity Act of 2003, or PREA, as amended and reauthorized, certain NDAs or supplements to an NDA must contain data that are adequate to assess the safety and effectiveness of the drug for the claimed indications in all relevant pediatric subpopulations, and to support dosing and administration for each pediatric subpopulation for which the product is safe and effective. The FDA may, on its own initiative or at the request of the applicant, grant deferrals for submission of some or all pediatric data until after approval of the product for use in adults, or full or partial waivers from the pediatric data requirements.

The FDA also may require submission of a risk evaluation and mitigation strategy, or REMS, plan to ensure that the benefits of the drug outweigh its risks. The REMS plan could include medication guides, physician communication plans, assessment plans or elements to assure safe use, such as restricted distribution methods, patient registries or other risk minimization tools.

The FDA conducts a preliminary review of all NDAs within the first 60 days after submission, before accepting them for filing, to determine whether they are sufficiently complete to permit substantive review. The FDA may request additional information rather than accept an NDA for filing. In this event, the application must be resubmitted with the additional information. The resubmitted application is also subject to review before the FDA accepts it for filing. Once the submission is accepted for filing, the FDA begins an in-depth substantive review. The FDA reviews an NDA to determine, among other things, whether the drug is safe and effective and whether the facility in which it is manufactured, processed, packaged or held meets standards designed to assure the product's continued safety, quality and purity. During its review, the FDA may raise additional issues or request additional data or information, during which time, the review period is generally suspended until such requests are received. This can delay, sometimes substantially, the FDA's review and potential approval of an application.

The FDA may refer an application for a novel drug to an advisory committee. An advisory committee is a panel of independent experts, including clinicians and other scientific experts, that reviews, evaluates and provides a recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations carefully when making decisions.

Before approving an NDA, the FDA typically will inspect the facility or facilities where the product is manufactured. The FDA will not approve an application unless it determines that the manufacturing processes and facilities are in compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications. Additionally, before approving an NDA, the FDA may inspect one or more clinical trial sites to assure compliance with GCP requirements.

After evaluating the NDA and all related information, including the advisory committee recommendation, if any, and inspection reports regarding the manufacturing facilities and clinical trial sites, the FDA may issue an approval letter, or, in some cases, a complete response letter. A complete response letter generally contains a statement of specific conditions that must be met in order to secure final approval of the NDA and may require additional clinical or preclinical testing in order for FDA to reconsider the application. Even with submission of this additional information, the FDA ultimately may decide that the application does not satisfy the regulatory criteria for approval. If and when those conditions have been met to the FDA's satisfaction, the FDA will typically issue an approval letter. An approval letter authorizes commercial marketing of the drug with specific prescribing information for specific indications.

Even if the FDA approves a product, it may limit the approved indications for use of the product, require that contraindications, warnings or precautions be included in the product labeling, require that post-approval studies, including Phase 4 clinical trials, be conducted to further assess a drug's safety after approval, require testing and surveillance programs to monitor the product after commercialization, or impose other conditions, including

distribution and use restrictions or other risk management mechanisms under a REMS, which can materially affect the potential market and profitability of the product. The FDA may prevent or limit further marketing of a product based on the results of post-marketing studies or surveillance programs or if unexpected safety or efficacy concerns arise. 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 testing requirements and FDA review and approval. In addition, new government requirements, including those resulting from new legislation, may be established, or the FDA's policies may change, which could impact the timeline for regulatory approval or otherwise impact ongoing development programs. For example, in December 2016, the 21st Century Cures Act was signed into law. The Act is intended, among other things, to modernize the regulation of drugs and biologics and to encourage innovation.

Special FDA Expedited Review and Approval Programs

The FDA has various programs, including fast track designation, accelerated approval, priority review and breakthrough therapy designation, which are intended to expedite or simplify the process for the development and FDA review of drugs that are intended for the treatment of serious or life-threatening diseases or conditions and demonstrate the potential to address unmet medical needs. The purpose of these programs is to provide important new drugs to patients earlier than under standard FDA review procedures.

To be eligible for a fast track designation, the FDA must determine, based on the request of a sponsor, that a product is intended to treat a serious or life-threatening disease or condition and demonstrates the potential to address an unmet medical need. The FDA will determine that a product will fill an unmet medical need if it will provide a therapy where none exists or provide a therapy that may be potentially superior to existing therapy based on efficacy or safety factors. The FDA may review sections of the NDA for a fast track product on a rolling basis before the complete application is submitted, if the sponsor provides a schedule for the submission of the sections of the NDA, the FDA agrees to accept sections of the NDA and determines that the schedule is acceptable, and the sponsor pays any required user fees upon submission of the first section of the NDA.

The FDA may give a priority review designation to drugs that offer major advances in treatment or provide a treatment where no adequate therapy exists. A priority review means that the goal for the FDA to review an application is six months, rather than the standard review of ten months under current PDUFA guidelines. Under the new PDUFA agreement, these six and ten-month review periods are measured from the "filing" date rather than the receipt date for NDAs for new molecular entities, which typically adds approximately two months to the timeline for review and decision from the date of submission and may be suspended if the FDA requests additional information. Many products that are eligible for fast track designation are also likely to be considered appropriate to receive a priority review.

In addition, product candidates studied for their safety and effectiveness in treating serious or life-threatening illnesses and that provide meaningful therapeutic benefit over existing treatments may be eligible for accelerated approval and may be approved on the basis of adequate and well-controlled clinical trials establishing that the drug product has an effect on a surrogate endpoint that is reasonably likely to predict clinical benefit, or on a clinical endpoint that can be measured earlier than irreversible morbidity or mortality, that is reasonably likely to predict an effect on irreversible morbidity or mortality or other clinical benefit, taking into account the severity, rarity or prevalence of the condition and the availability or lack of alternative treatments. As a condition of approval, the FDA may require a sponsor of a drug receiving accelerated approval to perform post-marketing studies to verify and describe the predicted effect on irreversible morbidity or mortality or other clinical endpoint, and the drug may be subject to accelerated withdrawal procedures.

Moreover, under the provisions of the Food and Drug Administration Safety and Innovation Act, or FDASIA, passed in July 2012, a sponsor can request designation of a product candidate as a "breakthrough therapy." A breakthrough therapy is defined as a drug that is intended, alone or in combination with one or more other drugs, to treat a serious or life-threatening disease or condition, and preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. Drugs designated as breakthrough therapies are also eligible for accelerated approval. The FDA must take certain actions, such as holding timely meetings and

providing advice, intended to expedite the development and review of an application for approval of a breakthrough therapy.

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

Post-Approval Requirements

Drugs manufactured or distributed pursuant to FDA approvals are subject to pervasive and continuing regulation by the FDA, including, among other things, requirements relating to recordkeeping, periodic reporting, product sampling and distribution, advertising and promotion and reporting of adverse experiences associated with the product. After approval, most changes to the approved product, such as adding new indications or other labeling claims are subject to prior FDA review and approval. There also are continuing, annual user fee requirements for any marketed products.

The FDA may impose a number of post-approval requirements as a condition of approval of an NDA. For example, the FDA may require post-marketing testing, including Phase 4 clinical trials, and surveillance to further assess and monitor the product's safety and effectiveness after commercialization.

In addition, drug manufacturers and other entities involved in the manufacture and distribution of approved drugs are required to register their establishments with the FDA and state agencies and are subject to periodic unannounced inspections by the FDA and these state agencies for compliance with cGMP requirements. Changes to the manufacturing process are strictly regulated and often require prior FDA approval before being implemented. FDA regulations also require investigation and correction of any deviations from cGMP requirements and impose reporting and documentation requirements upon the sponsor and any third-party manufacturers that the sponsor may decide to use. Accordingly, manufacturers must continue to expend time, money and effort in the area of production and quality control to maintain cGMP compliance.

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

- restrictions on the marketing or manufacturing of the product, complete withdrawal of the product from the market or product recalls;
- fines, warning letters or holds on post-approval clinical trials;
- refusal of the FDA to approve pending NDAs or supplements to approved NDAs, or suspension or revocation of product approvals;
- product seizure or detention, or refusal to permit the import or export of products; or
- injunctions or the imposition of civil or criminal penalties.

The FDA strictly regulates marketing, labeling, advertising and promotion of products that are placed on the market. Drugs may be promoted only for the approved indications and in accordance with the provisions of the approved label. The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses, and a company that is found to have improperly promoted off-label uses may be subject to significant liability. Failure to comply with these requirements can result in, among other things, adverse publicity, warning letters, corrective advertising and potential civil and criminal penalties.

Coverage and Reimbursement

Sales of our product candidates, if approved, will depend, in part, on the extent to which such products will be covered by third-party payors, such as government healthcare programs, commercial insurance and managed healthcare organizations. These third-party payors are increasingly limiting coverage or reducing reimbursements for medical products and services. In addition, the U.S. government, state legislatures and foreign governments have continued 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 product candidates or a decision by a third-party payor to not cover our product candidates could reduce physician usage of our products, once approved, and have a material adverse effect on our sales, results of operations and financial condition.

Manufacturing and Supplies

We currently manufacture all drug substance, including NVN1000 (the API for all of our clinical stage product candidates), at our facility in Morrisville, North Carolina. We believe that our manufacturing capabilities represent a core competency for our Nitricil technology. In 2017, we also began manufacturing all drug product materials at our Morrisville, North Carolina facility, for use in our non-clinical studies and clinical trials.

We manufacture our investigational materials in accordance with cGMP required by the FDA, International Committee on Harmonization and other regulatory bodies. Our facilities have been audited for cGMP and Good Laboratory Practice, or GLP, compliance. In addition, our drug substance manufacturing processes and operating conditions have been evaluated and tested by qualified vendors to ensure a safe operating environment. These tests include raw materials and product handling, process chemistry, air quality and waste disposal and containment.

We are evaluating the potential transfer of API and drug product manufacturing to one or more third party contract manufacturing organizations, or CMOs, which would allow such CMOs to serve as secondary or possibly primary suppliers for our drug substances as well as clinical trial materials. Clinical trial materials manufacturing would include compounding and primary packaging necessary for finished drug product. These CMOs would also likely supply drug substance and drug product materials to support commercialization of any of our other product candidates, subject to FDA approval. In such cases, they may be the primary suppliers for these product candidates.

We currently rely on third-party suppliers to provide the raw materials that are used by us or our third-party manufacturers in the manufacture of our drugs. There are a limited number of suppliers for raw materials, including nitric oxide, that we use to manufacture our drugs.

Single Business Segment

We manage our operations and allocate resources as one reporting segment. For additional information, please refer to the notes to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

Research and Development Expenses

Our research and development expenses were $25.2 million, $46.5 million and $16.6 million for the years ended December 31, 2017, 2016 and 2015, respectively. Our research and development expenses for 2017, 2016 and 2015 consisted primarily of costs associated with the preclinical and clinical development of our product candidates, including costs associated with our API and drug product development and manufacturing capabilities. See the section entitled “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in this Annual Report on Form 10-K for more information regarding our research and development expenses.

Employees

As of December 31, 2017, we had 59 employees, including 35 dedicated to our Nitricil technology and formulation science research, development and manufacturing capability, 10 in clinical operations, non-clinical development, and regulatory, and 14 in general and administrative functions. We also utilize consultants and contractors from time

to time to support our operating activities and our employees. None of our employees is subject to a collective bargaining agreement or represented by a labor or trade union. We believe that our relations with our employees are good.

Other Information

We were incorporated under the laws of the State of Delaware in 2006. Our principal executive offices are located at 4105 Hopson Road Morrisville, NC 27560, and our telephone number is 919-485-8080.

We maintain an internet website at www.novan.com and make available free of charge through our website our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and amendments to those reports filed or furnished pursuant to Sections 13(a) and 15(d) of the Exchange Act. We make these reports available through our website as soon as reasonably practicable after we electronically file such reports with, or furnish such reports to, the SEC. The information contained on, or that can be accessible through, our website is not incorporated by reference into, and should not be considered to be a part of, this Annual Report on Form 10-K.

Item 1A. Risk Factors.

Our operations and financial results are subject to a high degree of risk. These risks include, but are not limited to, those described below, each of which may have a material and adverse effect on our business, results of operations, cash flows, financial condition and the trading price of our common stock. You should carefully consider the risks described below, together with all of the other information included in this Annual Report on Form 10-K. The realization of any of these risks could have a significant adverse effect on our reputation, business, including our financial condition, results of operations and growth, which we refer to collectively in this section as our business, and ability to accomplish our strategic objectives. In that event, the trading price of our common stock could decline, and you may lose part or all of your investment.

Risks Related to the Development, Regulatory Approval and Commercialization of our Current and Future Product Candidates

We will need substantial additional funding. If we are unable to raise capital when needed, we would be forced to delay, reduce, terminate or eliminate our product development programs, or our commercialization efforts.

We expect to continue to incur substantial expenses in connection with our ongoing activities, including conducting clinical trials of our clinical-stage product candidates, and conducting activities necessary to pursue regulatory approval for our product candidates in the future. In addition, if we obtain regulatory approval of any of our product candidates, we expect to incur significant commercialization expenses for product sales, marketing, manufacturing and distribution. Furthermore, we expect to continue to incur substantial costs associated with operating as a public company. Accordingly, we will need to obtain substantial additional funding in connection with our continuing operations. Adequate funding may not be available to us on acceptable terms, or at all. If we are unable to raise capital when needed or on attractive terms, we would be forced to delay, reduce, terminate or eliminate our product development programs, or our commercialization efforts.

As of December 31, 2017, we had cash and cash equivalents of $2.5 million and negative working capital of $(4.7) million. We believe that our existing cash and cash equivalents, together with the net proceeds of our public offering in January 2018, will be sufficient to meet our anticipated cash requirements into the second quarter of 2019 and will allow us to execute our ongoing and planned near-term development activities, as described in the section entitled “Management’s Discussion and Analysis of Financial Condition and Results of Operations—Overview” of this Annual Report on Form 10-K. Although we successfully raised approximately $35.2 million in net proceeds from our January 2018 Public Offering, we anticipate that we will need substantial additional funding to continue our operating activities and make further advancements in each of our drug development programs, as described in the section entitled “Management’s Discussion and Analysis of Financial Condition and Results of Operations—Overview” of this Annual Report on Form 10-K. Further advancement of our development programs is dependent upon our ability to access additional capital through non-dilutive sources, including partnerships, collaborations, licensing, grants or other strategic relationships or through the issuance of debt or equity securities. There can be no assurance that we will be able to obtain additional capital on terms acceptable to us, on a timely basis or at all. A

failure to obtain sufficient funds on acceptable terms when needed could cause us to alter or reduce our planned operating activities, including but not limited to delaying planned product candidate development activities, to conserve our cash and cash equivalents. Such actions could delay development timelines and have a material adverse effect on our results of operations, financial condition and market valuation. As of December 31, 2017, we had an accumulated deficit of $160.2 million and there is substantial doubt about our ability to continue as a going concern if we do not secure adequate additional financing.

Our future capital requirements will depend on many factors, including:

- the initiation, progress, timing and costs of our non-clinical development, clinical trials and our analysis of the results of such trials for our clinical-stage product candidates;
- the scope, progress, results and costs of preclinical development, laboratory testing and clinical trials for our other pre-clinical or future product candidates;
- the extent to which we exercise any developmental or commercialization rights we may have under any arrangements with collaborators or partners;
- costs, timing and outcome of regulatory review of our product candidates;
- costs of commercialization activities, including product sales, marketing, manufacturing and distribution, for any of our product candidates for which we receive regulatory approval;
- costs of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property rights and defending intellectual property-related claims;
- the extent to which we acquire or invest in other businesses, products and technologies;
- our ability to obtain government or other third-party funding for the development of our product candidates;
- the costs associated with our securities litigation, and the outcome of that litigation;
- the occurrence and timing of potential development and regulatory milestones achieved by Sato, our licensee for SB204 in certain topical dosage forms in Japan;
- our ability to establish additional partnering and collaborations on favorable terms, if at all; and
- revenue, if any, received from commercial sales of our product candidates, should any of our product candidates be approved by the FDA or a similar regulatory authority outside the United States.

Conducting preclinical testing and clinical trials is a time-consuming, expensive and uncertain process that takes years to complete, and we may never generate the necessary data or results required to obtain regulatory approval and achieve product sales. In addition, our product candidates, if approved, may not achieve commercial success. Our commercial revenues, if any, will be derived from sales of products that we do not expect to be commercially available for several years, if at all. Accordingly, we will need to continue to rely on additional financing to achieve our business objectives. Additional financing may not be available to us on acceptable terms, or at all. In addition, we currently have outstanding warrants to purchase approximately 10 million shares of our common stock. We may find it more difficult to raise additional equity capital if it should be needed for our business while the warrants are outstanding.

Drug development involves a lengthy and expensive process with uncertain outcomes, and results from earlier studies and trials may not be predictive of future trial results.

Clinical testing is expensive and can take many years to complete, and its outcome is inherently uncertain. Failure or delay can occur at any time during the clinical trial process. Success in preclinical testing and early clinical trials does not ensure that later clinical trials will be successful. A number of companies in the pharmaceutical and biotechnology industries have suffered significant setbacks in clinical trials, even after promising results in earlier preclinical studies or clinical trials. These setbacks have been caused by, among other things, preclinical findings made while clinical trials were underway and safety or efficacy observations made in clinical trials, including previously unreported adverse events.

The results of preclinical studies and early clinical trials of our product candidates may not be predictive of the results of later-stage clinical trials. Product candidates in later stages of clinical trials may fail to show the required safety profile or meet the efficacy endpoints despite having progressed through preclinical studies and initial clinical trials. Notwithstanding any potential promising results in earlier testing, we cannot be certain that we will not face similar setbacks. Even if our clinical development is completed for any of our product candidates, the results may not be sufficient to obtain regulatory approval for our product candidates.

For example, the top-line results of our two identically designed Phase 3 pivotal clinical trials for SB204 revealed that SB204 demonstrated statistical significance on all three co-primary endpoints in one trial, but demonstrated statistical significance on only one of the three co-primary endpoints in the other trial. Following an in-depth analysis of the full data sets from our two identically designed Phase 3 pivotal clinical trials for SB204, including post hoc analyses in pooled and sub populations, and after receiving feedback from the FDA in September 2017, we believe it is necessary to conduct additional Phase 3 program development activities for SB204 prior to NDA submission. As described in the section entitled "Management's Discussion and Analysis of Financial Condition and Results of Operations—Overview—Product Candidate Outlook—SB204" of this Annual Report on Form 10-K, we expect to obtain additional FDA input and guidance during a Type C meeting scheduled in the second quarter of 2018. We believe further FDA input from the upcoming meeting will facilitate (i) finalization of our Phase 3 strategy and (ii) conclusion and execution of a strategic arrangement that will facilitate execution of our strategy. We cannot assure you that the FDA's feedback, if any, and the resulting clinical trial design will achieve trial results that are sufficient to support an FDA submission for our acne product candidate, or regulatory approval of that product, or that we will be able to complete a strategic arrangement, whether through the contemplated arrangement or another one, to finance and support the development necessary to achieve these objectives.

Delay or termination of planned clinical trials for our product candidates could result in unplanned expenses or significantly adversely impact our commercial prospects with respect to, and ability to generate revenues from, such product candidates.

We may experience delays in completing ongoing trials and initiating planned trials and we cannot be certain whether these trials or any other future clinical trials for our product candidates will begin on time, need to be redesigned, enroll an adequate number of patients on time or be completed on schedule, if at all. Clinical trials can be delayed or terminated for a variety of reasons, including delays or failures related to:

- the FDA disagreeing as to the design or implementation of our clinical trials;
- reaching agreement on acceptable terms with prospective contract research organizations, or CROs clinical trial sites and prospective strategic partners, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs, trial sites and partners;
- obtaining institutional review board, or IRB, approval at each site;
- the safety profiles of our product candidates;
- recruiting suitable patients to participate in a trial;
- having patients complete a trial or return for post-treatment follow-up;
- clinical sites deviating from trial protocol;
- addressing patient safety concerns that arise during the course of a trial;
- adding a sufficient number of clinical trial sites;
- manufacturing sufficient quantities of product candidate for use in clinical trials; or
- changes to our financial priorities or insufficient capital available to fund clinical trials.

We could also encounter delays if a clinical trial is suspended or terminated by us, by the IRBs of the institutions in which such trials are being conducted, by the Data Safety Monitoring Board, or DSMB, for such trial or by the FDA or other regulatory authorities. Such authorities may suspend or terminate a clinical trial due to a number of factors, including failure to conduct the clinical trial in accordance with regulatory requirements or our clinical protocols,

inspection of the clinical trial operations or trial site by the FDA or other regulatory authorities resulting in the imposition of a clinical hold, unforeseen safety issues or adverse events, failure to demonstrate a benefit from using a drug, changes in governmental regulations or administrative actions or lack of adequate funding to continue the clinical trial. Even if we complete our trials on schedule, inconsistent trial results may result in a delay in our completion of an overall program for a product candidate.

If we experience delays in the completion, or termination, of any clinical trials for our product candidates, we may experience increased costs, have difficulty raising capital through non-dilutive or dilutive sources, and have to slow down our product candidate development and regulatory approval process timelines. Further, the commercial prospects of our product candidates may be harmed and our ability to generate product revenues from any of these product candidates could be delayed or not realized at all. Any of these occurrences may significantly harm our business, financial condition and prospects. In addition, many of the factors that cause, or lead to, a delay in the commencement or completion of clinical trials may also ultimately lead to the denial of regulatory approval of our product candidates.

In addition, our ongoing or future preclinical studies may not prove successful in demonstrating proof-of concept, or may show adverse toxicological findings, and even if successful may not necessarily predict that subsequent clinical trials will show the requisite safety and efficacy of our product candidates.

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

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

- the patient eligibility criteria defined in the protocol;
- the size of the patient population required for analysis of the trial's primary endpoints;
- the proximity of patients to trial sites;
- the design of the trial;
- our ability to recruit clinical trial investigators with the appropriate competencies and experience;
- clinicians' and patients' perceptions as to the potential advantages of the product candidate being studied in relation to other available therapies, including any new drugs that may be approved for the indications we are investigating;
- our ability to obtain patient consents; and
- the risk that patients enrolled in clinical trials will drop out of the trials before completion.

In addition, our clinical trials will compete for the recruitment of patients with other clinical trials for product candidates that are in the same therapeutic areas as our product candidates, and this competition will reduce the number and types of patients available to us, because some patients who might have opted to enroll in our trials may instead opt to enroll in a trial being conducted by one of our competitors.

Delays in patient enrollment may result in increased costs, which would adversely impact our statement of operations and cash flows or may affect the timing or outcome of the planned clinical trials, which could prevent completion of these trials and adversely affect our ability to advance the development of our product candidates and hurt our competitive position.

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

Because we have limited financial and managerial resources, we intend to focus on developing product candidates for specific indications that we identify as most likely to succeed, in terms of their potential both to gain regulatory approval and to achieve commercialization. As a result, we may forego or delay pursuit of opportunities with other product candidates or in other indications with greater commercial potential.

Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities. Our spending on current and future research and development programs and product candidates for specific indications may not yield any commercially viable product candidates. If we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through collaboration, licensing or other royalty arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to the product candidate.

Our product candidates may pose safety issues, cause adverse events or have other properties that could delay or prevent their regulatory approval, limit the commercial profile of an approved label, or result in significant negative consequences following marketing approval, if any.

We, any partner with whom we may collaborate in the future or the FDA may suspend, delay, require modifications to or terminate our clinical trials at any time, for various reasons, including the discovery of serious or unexpected toxicities or other safety issues experienced by trial participants.

In addition, adverse events caused by our product candidates could cause us or regulatory authorities to interrupt, delay or halt clinical trials and could result in a more restrictive label or the delay or denial of regulatory approval by the FDA or comparable foreign regulatory authorities. Results of our clinical trials could reveal a high and unacceptable severity and prevalence of adverse events or unexpected characteristics. To date, patients treated with our product candidates have experienced drug-related cutaneous tolerability observations, including dryness, scaling, burning, erythema, itching, pain or irritation, and adverse events, including irritation and contact dermatitis.

If safety issues or unacceptable adverse events arise in the development of our product candidates, we, the FDA, the IRBs at the institutions in which our trials are conducted, or the DSMB could suspend or terminate our clinical trials or the FDA or comparable foreign regulatory authorities could order us to cease clinical trials or deny approval of our product candidates for any or all targeted indications. Treatment-related adverse events could also affect patient recruitment or the ability of enrolled patients to complete the trial or result in potential product liability claims. In addition, these adverse events may not be appropriately recognized or managed by the treating medical staff.

Any of the foregoing events could prevent us from achieving or maintaining market acceptance of the particular product candidate, if approved, and may result in the loss of significant revenues to us, which would materially and adversely affect our results of operations and business.

We may rely on strategic relationships for the further development and commercialization of our product candidates, and if we are unable to enter into such relationships, or if such relationships are unsuccessful, we may be unable to realize the potential economic benefit of those product candidates.

We are exploring alternative pathways for continued development of our product candidates. For example, we are currently exploring and intend to advance certain clinical-stage product candidates through partnerships, collaborations or other strategic relationships, including the contemplated arrangement associated with our acne product candidate as described in the section entitled "Management's Discussion and Analysis of Financial Condition and Results of Operations—Overview—Product Candidate Outlook—SB204" of this Annual Report on Form 10-K. We cannot assure you that we will be able to complete a strategic arrangement, whether through the contemplated arrangement or another one, to finance and support the necessary development for our acne product candidate. If we are unable to enter into strategic relationships on terms that are beneficial to us, or at all, we may not have sufficient capital to continue developing or commercialize our product candidates that are outside of our

current core focus. Even if we enter into such a strategic relationship, we may have to relinquish a significant portion of the future economic value of the underlying product candidate in connection with the applicable transaction and may be limited in our ability, or unable, to recover such value.

Our ability to enter into successful strategic relationships for the continued development of one or more of our product candidates may be impaired by several factors, including, among others, that:

- we will face significant competition in seeking appropriate strategic partners, and the negotiation process is likely to be time-consuming and complex;
- strategic partners may fail to secure sufficient capital resources from their investors in amounts required to fund planned development activities;
- strategic partners may not devote the necessary resources to complete development activities because of limited financial or scientific resources or the belief that other product candidates may have a higher likelihood of obtaining approval or potentially generate a greater return on investment;
- strategic partners may fail to properly maintain or defend our intellectual property rights, where applicable, or may use proprietary information in a way that may expose us to potential loss or liability;
- we are likely to have limited control over decisions of strategic partners that may result in significant delays or the termination of development of our product candidates;
- strategic partners may develop a product that competes, directly or indirectly, with our product candidates, or may choose to pursue alternative technologies, including those of our competitors; and
- disputes between us and our strategic partners concerning the research, development or commercialization of our product candidates or our arrangements with respect to our product candidates could lead to ligation or arbitration that would be costly and detract time from development.

Further, if a strategic relationship terminates or is otherwise unsuccessful, we may need to seek out and establish an alternative arrangement. This may not be possible, or we may not be able to do so on terms which are acceptable to us, in which case, it may be necessary for us to cease the development of the applicable product candidate or candidates, or conduct the remaining clinical development on our own and with our own funds.

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

The time required to obtain approval by the FDA is unpredictable but typically takes many years following the commencement of clinical trials and depends upon numerous factors, including the substantial discretion of the regulatory authorities. In addition, approval policies, regulations, or the type and amount of clinical data necessary to gain approval may change during the course of a product candidate's clinical development and may vary among jurisdictions. We have not obtained regulatory approval for any product candidate and it is possible that none of our existing product candidates or any product candidates we may seek to develop in the future will ever obtain regulatory approval. Neither we nor any future collaborator is permitted to market any of our product candidates in the United States until we receive regulatory approval of an NDA from the FDA.

Prior to obtaining approval to commercialize a product candidate in the United States or abroad, we or our collaborators must demonstrate with substantial evidence from well-controlled clinical trials, and to the satisfaction of the FDA, that such product candidates are safe and effective for their intended uses. Results from preclinical studies and clinical trials can be interpreted in different ways. Even if we believe the preclinical or clinical data for our product candidates are promising, such data may not be sufficient to support approval by the FDA and other regulatory authorities. For example, there are multiple methodologies for handling missing data and other statistical considerations to take into account that the FDA may utilize when analyzing the robustness of any data set during NDA review. The FDA may also require us to conduct additional preclinical studies or clinical trials for our product candidates either prior to or post-approval, or it may object to elements of our clinical development program.

The FDA can delay, limit or deny approval of our product candidates or require us to conduct additional preclinical or clinical testing or abandon a program for many reasons, including:

- the FDA's disagreement with the design or implementation of our clinical trials;
- negative or ambiguous results from our clinical trials;
- results that may not meet the level of statistical significance required by the FDA for approval;
- serious and unexpected drug-related adverse events experienced by participants in our clinical trials or by individuals using drugs similar to our product candidates;
- our inability to demonstrate to the satisfaction of the FDA that our product candidates are safe and effective for the proposed indication;
- the FDA's disagreement with the interpretation of data from preclinical studies or clinical trials;
- our inability to demonstrate that the clinical and other benefits of our product candidates outweigh any safety or other perceived risks;
- the FDA's requirement for additional preclinical studies or clinical trials;
- the FDA's disagreement regarding the formulation, labeling or the specifications of our product candidates;
- the FDA's failure to approve the manufacturing processes or facilities of third-party manufacturers with which we contract; or
- the potential for approval policies or regulations of the FDA to significantly change in a manner rendering our clinical data insufficient for approval.

Of the large number of drugs in development, only a small percentage successfully complete the FDA approval process and become commercialized. The lengthy approval process as well as the unpredictability of outcomes from future clinical trials may result in our failing to obtain regulatory approval to market our product candidates.

Even if we eventually complete clinical testing and receive approval of an NDA or foreign marketing application for our product candidates, the FDA may grant approval contingent on the performance of costly additional clinical trials, including Phase 4 clinical trials, or the implementation of a Risk Evaluation and Mitigation Strategy, or REMS, which may be required to ensure safe use of the drug after approval. The FDA also may approve a product candidate for a more limited indication or patient population than we originally requested, and the FDA may not approve the labeling that we believe is necessary or desirable for the successful commercialization of a product candidate. Any delay in obtaining, or inability to obtain, applicable regulatory approval would delay or prevent commercialization of that product candidate.

Even if we make a submission under a special protocol assessment, or SPA, from the FDA, there is no guarantee that we will obtain agreement from the FDA on the SPA. Even if we do obtain the FDA's agreement, an SPA would not guarantee approval of any of our product candidates or any other particular outcome from regulatory review.

We currently do not have an SPA in place with respect to any of our product candidates. However, we may, in the future, decide to make a submission for an SPA for any of our current or future product candidates.

The FDA's SPA process is designed to facilitate the FDA's review and approval of drugs by allowing the FDA to evaluate, among other things, the proposed design and size of clinical trials that are intended to form the primary basis for determining a drug product's efficacy. Upon specific request by a clinical trial sponsor, the FDA will evaluate the protocol and respond to a sponsor's questions regarding, among other things, primary efficacy endpoints, trial conduct and data analysis. The FDA aims to complete SPA reviews within 45 days of receipt of the request. The FDA ultimately assesses whether the protocol design and planned analysis of the trial are acceptable to support regulatory approval of the product candidate with respect to the effectiveness of the indication studied. All agreements and disagreements between the FDA and the sponsor regarding an SPA must be clearly documented in an SPA letter or the minutes of a meeting between the sponsor and the FDA.

Even if the FDA agrees to the SPA, an SPA agreement does not guarantee approval of a product candidate. Even if the FDA agrees to the design, execution, and analysis proposed in protocols reviewed under the SPA process, the FDA may revoke or alter its agreement in certain circumstances. In particular, an SPA agreement is not binding on the FDA if public health concerns emerge that were unrecognized at the time of the SPA agreement, other new scientific concerns regarding product safety or efficacy arise, the sponsor company fails to comply with the agreed upon trial protocols, or the relevant data, assumptions or information provided by the sponsor in a request for the SPA change or are found to be false or omit relevant facts. In addition, even after an SPA agreement is finalized, the SPA agreement may be modified, and such modification will be deemed binding on the FDA review division, except under the circumstances described above, if the FDA and the sponsor agree in writing to modify the protocol and if generally such modification is intended to improve the study. The FDA retains significant latitude and discretion in interpreting the terms of the SPA agreement and the data and results from any study that is the subject of the SPA agreement.

Moreover, if the FDA revokes or alters its agreement under the SPA, or interprets the data collected from the clinical trial differently than we do, the FDA may not deem the data sufficient to support an application for regulatory approval.

Regulatory approval of our product candidates by foreign regulatory authorities may be delayed or denied. We may be subject to pricing controls imposed by foreign governments and regulatory authorities.

We may seek regulatory approval of our product candidates from foreign regulatory authorities in the future. Such regulatory authorities may impose additional regulations and guidelines that differ in form and substance from those imposed by their counterparts in the United States and with which we are more familiar. Accordingly, the regulatory approval of our product candidates in those foreign jurisdictions could be delayed, limited or denied altogether. This could limit the scope of or prevent the commercialization of our products in the future and adversely affect our financial performance.

Further, in some countries, the pricing of pharmaceutical prescriptions is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take considerable time after the receipt of marketing approval for a product candidate. In addition, there can be considerable pressure by governments and other stakeholders on prices and reimbursement levels, including as part of cost containment measures. Political, economic and regulatory developments may further complicate pricing negotiations, and pricing negotiations may continue after coverage and reimbursement have been obtained. Reference pricing used by various countries and parallel distribution or arbitrage between low-priced and high-priced countries can further reduce prices. To obtain reimbursement or pricing approval in some countries, we may be required to conduct a clinical trial that compares the cost-effectiveness of our product candidate to other available therapies, which is time-consuming and costly. If coverage and reimbursement of our product candidates are unavailable or limited in scope or amount, or if pricing is set at unsatisfactory levels, our business could be harmed.

We may face product liability exposure, and if successful claims are brought against us, we may incur substantial liability if our insurance coverage for those claims is inadequate.

We face an inherent risk of product liability as a result of the clinical testing of our product candidates and will face an even greater risk if we commercialize any products. This risk exists even if a product is approved for commercial sale by the FDA and manufactured in facilities licensed and regulated by the FDA or an applicable foreign regulatory authority. Our product candidates are designed to affect important bodily functions and processes. Any adverse events, manufacturing defects, misuse or abuse associated with our product candidates could result in injury to a patient or even death. We cannot offer any assurance that we will not face product liability suits in the future, nor can we assure you that our insurance coverage will be sufficient to cover our liability under any such cases.

In addition, a liability claim may be brought against us even if our product candidates merely appear to have caused an injury. Product liability claims may be brought against us by consumers, healthcare providers, pharmaceutical companies or others selling or otherwise coming into contact with our product candidates, among others. If we cannot successfully defend ourselves against product liability claims we will incur substantial liabilities and reputational harm. In addition, regardless of merit or eventual outcome, product liability claims may result in:

- withdrawal of clinical trial participants;
- decreased enrollment rates of clinical trial participants;
- termination of clinical trial sites or entire trial programs;
- the inability to commercialize our product candidates;
- decreased demand for our product candidates;
- impairment of our business reputation;
- product recall or withdrawal from the market or labeling, marketing or promotional restrictions;
- substantial costs of any related litigation or similar disputes;
- distraction of management's attention and other resources from our primary business;
- substantial monetary awards to patients or other claimants against us that may not be covered by insurance; or
- loss of revenue.

We have obtained product liability insurance coverage, with an aggregate limit of $5.0 million, for clinical trials. Large judgments have been awarded in class action or individual lawsuits based on drugs that had unanticipated adverse events. Our insurance coverage may not be sufficient to cover all of our product liability related expenses or losses and may not cover us for any expenses or losses we may suffer. Moreover, insurance coverage is becoming increasingly expensive, and, in the future, we may not be able to maintain insurance coverage at a reasonable cost, in sufficient amounts or upon adequate terms to protect us against losses due to product liability. We will need to increase our product liability coverage if any of our product candidates receive regulatory approval, which will be costly, and we may be unable to obtain this increased product liability insurance on commercially reasonable terms, or at all. A successful product liability claim or series of claims brought against us could cause our stock price to decline and, if judgments exceed our insurance coverage, could decrease our cash, negatively impact our statement of operations and could harm our financial condition.

If we receive regulatory approval to market any of our product candidates, our relationships with healthcare providers, customers and third-party payors, as well as our general business operations, may be subject to applicable anti-kickback, fraud and abuse and other healthcare laws and regulations, and failure to comply with such regulations could expose us to penalties including criminal sanctions, civil penalties, exclusion from government healthcare programs, contractual damages, reputational harm and diminished profits and future earnings.

Healthcare providers, customers and third-party payors will play a primary role in the recommendation and prescription of any product candidates for which we may obtain marketing approval. Our future arrangements with third-party payors, healthcare providers and customers and our general operations may expose us to broadly applicable fraud and abuse and other healthcare laws and regulations that may constrain the business or financial arrangements and relationships through which we market, sell and distribute any product candidates for which we obtain marketing approval. Restrictions under applicable federal and state healthcare laws and regulations may include the following:

- the federal Anti-Kickback Statute, which prohibits, among other things, persons and entities from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward, or in return for, either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made, in whole or in part, under a federal healthcare program such as Medicare and Medicaid. A person or entity does not

need to have actual knowledge of the federal Anti-Kickback Statute or specific intent to violate it in order to have committed a violation.

- the federal false claims and civil monetary penalties laws, including the civil False Claims Act, which impose criminal and civil penalties, including through civil whistleblower or qui tam actions, against individuals or entities for knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false or fraudulent or knowingly making a false statement to avoid, decrease or conceal an obligation to pay money to the federal government; in addition, the government may assert that a claim including items and services resulting from a violation of the U.S. federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the False Claims Act;
- the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, which imposes criminal and civil liability for, among other things, executing or attempting to execute a scheme to defraud any healthcare benefit program or making false statements relating to healthcare matters. Similar to the federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, or HITECH, and their implementing regulations, which also imposes obligations, including mandatory contractual terms, on certain types of people and entities with respect to safeguarding the privacy, security and transmission of individually identifiable health information;
- the federal Physician Payments Sunshine Act, which requires manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program (with certain exceptions) to report annually to the government information related to certain payments or other ''transfers of value'' made to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors) and teaching hospitals, and requires applicable manufacturers to report annually to the government ownership and investment interests held by the physicians described above and their immediate family members and payments or other ''transfers of value'' to such physician owners; and
- analogous state and foreign laws and regulations, such as state anti-kickback and false claims laws, which may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers; state laws that require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government; state laws that require drug manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or report marketing expenditures and pricing information; and state and foreign laws governing the privacy and security of health information in some circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

Efforts to ensure that our internal operations and business arrangements with third parties comply with applicable healthcare laws and regulations will involve substantial costs. It is possible that governmental authorities will conclude that our business practices may not comply with current or future statutes, regulations or case law involving applicable fraud and abuse or other healthcare laws and regulations. The risk of our being found in violation of these laws is increased by the fact that many of them have not been fully interpreted by the regulatory authorities or the courts, and their provisions are open to a variety of interpretations. Because of the breadth of these laws and the narrowness of the statutory exceptions and safe harbors available under such laws, it is possible that some of our business activities, including our relationships with physicians and other healthcare providers, some of whom will recommend, purchase or prescribe our products, could be subject to challenge under one or more of such laws.

If our operations are found to be in violation of any of these laws or any other governmental laws and regulations that may apply to us, we may be subject to significant civil, criminal and administrative penalties, damages, fines, imprisonment, exclusion of products from government funded healthcare programs, such as Medicare and Medicaid, disgorgement, contractual damages, reputational harm, diminished profits and the curtailment or restructuring of our operations. If any of the physicians or other healthcare providers or entities with whom we expect to do business is found to be not in compliance with applicable laws, they may be subject to criminal, civil or administrative

sanctions, including exclusions from government funded healthcare programs, which would adversely impact our statement of operations and cash flows.

Even if our current product candidates or any future product candidates obtain regulatory approval, they may fail to achieve the broad degree of physician and patient adoption and use necessary for commercial success.

The commercial success of any of our current or future product candidates, if approved, will depend significantly on the broad adoption and use of the resulting product by physicians and patients for approved indications. Our product candidates may not be commercially successful. The degree and rate of physician and patient adoption of our current or future product candidates, if approved, will depend on a number of factors, including:

- the clinical indications for which the product is approved and patient demand for approved products that treat those indications;
- the effectiveness of our product as compared to other available therapies;
- the availability of coverage and adequate reimbursement from managed care plans and other healthcare payors for any of our product candidates that may be approved;
- the cost of treatment with our product candidates in relation to alternative treatments and willingness to pay for the product, if approved, on the part of patients;
- acceptance by physicians, major operators of clinics and patients of the product as a safe and effective treatment;
- physician and patient willingness to adopt a new therapy over other available therapies to treat approved indications;
- overcoming any biases physicians or patients may have toward particular therapies for the treatment of approved indications;
- patient satisfaction with the results and administration of our product candidates and overall treatment experience;
- the willingness of patients to pay for certain of our product candidates relative to other discretionary items, especially during economically challenging times;
- the revenue and profitability that our product candidates may offer a physician as compared to alternative therapies;
- the prevalence and severity of adverse events;
- limitations or warnings contained in the FDA-approved labeling for our product candidates;
- any FDA requirement to undertake a REMS;
- the effectiveness of our sales, marketing and distribution efforts;
- adverse publicity about our product candidates or favorable publicity about competitive products; and
- potential product liability claims.

If any of our current or future product candidates are approved for use but fail to achieve the broad degree of physician and patient adoption necessary for commercial success, our operating results and financial condition will be adversely affected, which may delay, prevent or limit our ability to generate revenue and continue our business.

Our product candidates may cause side effects which could delay or prevent their commercialization.

If any of our product candidates receives marketing approval, and we or other companies developing other nitric oxide-based therapies, including KNOW Bio, which has the right to develop our current nitric oxide-based technology in non-dermatological and non-oncoviral-mediated indications, later identify undesirable side effects caused by such products, a number of potentially significant negative consequences could result, including:

- regulatory authorities may withdraw their approval of the product;
- we may be required to recall a product or change the way such product is administered to patients;
- additional restrictions may be imposed on the marketing of the particular product or the manufacturing processes for the product or any component thereof;
- regulatory authorities may require the addition of labeling statements, such as a ‘‘black box’’ warning or a contraindication;
- we may be required to implement a REMS or create a Medication Guide outlining the risks of such adverse events for distribution to patients;
- we could be sued and held liable for harm caused to patients;
- the product may become less competitive; and
- our reputation may suffer.

We expect to educate and train medical personnel so they know how to use our product candidates to understand their potential side effect profiles. Inadequate training in recognizing or managing the potential side effects of our product candidates could result in patient injury.

If we are unable to establish sales, marketing and distribution capabilities for our product candidates or any future product candidate that receives regulatory approval, we may not be successful in commercializing those product candidates, if approved.

We do not currently have a sales, marketing or distribution infrastructure in place. To achieve commercial success for any product candidate for which we may obtain marketing approval, we will need to establish a sales, marketing and distribution framework internally or through a commercial partner or other form of strategic relationship for commercialization. In the future, we may build a focused sales, marketing and distribution infrastructure to market any of our product candidates in the United States. There are risks involved with establishing our own sales, marketing and distribution capabilities. For example, recruiting and training a sales force is expensive and time-consuming and could delay market uptake. If the commercial launch of a product candidate for which we recruit a sales force and establish marketing capabilities is delayed or does not occur for any reason, we would have prematurely or unnecessarily incurred these commercialization expenses. This may be costly, and our investment would be lost if we cannot retain or reposition our sales and marketing personnel.

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

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

If we are unable to establish our own sales, marketing and distribution capabilities and enter into arrangements with third parties to perform these services, this could, in turn, decrease our revenue and our profitability. In addition, we may not be successful in entering into arrangements with third parties to sell, market and distribute our product candidates or may be unable to do so on terms that are favorable to us. We may not have adequate 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, marketing and distribution capabilities successfully, either on our own or in collaboration with third parties, we will not be successful in commercializing our product candidates.

Additionally, we have entered into an exclusive license agreement with Sato relating to SB204 for the treatment of acne vulgaris in Japan, and we expect to continue to evaluate strategic partnerships to commercialize our dermatology products in select international markets. We may not be sufficiently familiar or have the requisite resources to penetrate international markets where some of our competitors have already achieved broad recognition and have established commercialization strategies in place. Moreover, we may not succeed in targeting healthcare providers, including physicians, who may not be familiar with our product candidates.

Our product candidates, if approved, will face significant competition and our failure to effectively compete may prevent us from achieving significant market penetration.

The pharmaceutical industry is characterized by rapidly advancing technologies, intense competition and a strong emphasis on developing proprietary therapeutics. Numerous companies are engaged in the development, patenting, manufacturing and marketing of healthcare products competitive with those that we are developing. We face competition from a number of sources, such as pharmaceutical companies, generic drug companies, biotechnology companies and academic and research institutions, many of which have greater financial resources, marketing capabilities, sales forces, manufacturing capabilities, research and development capabilities, clinical trial expertise, intellectual property portfolios, experience in obtaining patents and regulatory approvals for product candidates and other resources than we do. Some of the companies that offer competing products also have a broad range of other product offerings, large direct sales forces and long-term customer relationships with our target physicians, which could inhibit our market penetration efforts. In addition, certain of our product candidates, if approved, may compete with other products, including over-the-counter treatments, for a share of some patients' discretionary budgets and for physicians' attention within their clinical practices.

Many pharmaceutical companies currently offer products and continue to develop additional alternative product candidates and technologies for indications similar to those targeted by our product candidates, as described in the section entitled "Business—Competition" in this Annual Report on Form 10-K. The markets in which we compete, particularly the market for dermatological therapies, are competitive and are characterized by significant technological development and new product introduction. We anticipate that, if we obtain regulatory approval of our product candidates, we will face significant competition from other approved therapies. If approved, our product candidates may also compete with unregulated, unapproved and off-label treatments. To compete successfully in the marketplace, we will have to demonstrate that the relative cost, safety and efficacy of our approved products, if any, provide an attractive alternative to existing and other new therapies. Such competition could lead to reduced market share for our product candidates and contribute to downward pressure on the pricing of our product candidates.

Due to less stringent regulatory requirements in certain foreign countries, there are many more products and procedures available for use in those international markets than are approved for use in the United States. In certain international markets, there are also fewer limitations on the claims that our competitors can make about the effectiveness of their products and the manner in which they can market them. As a result, we expect to face more competition in these markets than in the United States.

Even if we obtain marketing approval for any product candidates, the products may become subject to unfavorable third-party coverage or reimbursement policies, which would harm our business.

The success of our product candidates, if approved, depends on the availability of adequate coverage and reimbursement from government authorities and third-party payors, such as private health insurers and health maintenance organizations. Patients who are provided medical treatment for their conditions generally rely on third-party payors to reimburse all or part of the costs associated with their treatment. Adequate coverage and reimbursement from governmental healthcare programs, such as Medicare and Medicaid, and commercial payors is critical to product acceptance.

Government authorities and third-party payors, such as private health insurers and health maintenance organizations, decide which drugs and treatments they will cover and the amount of reimbursement that will be provided. Coverage

decisions may depend on clinical and economic standards that disfavor new products when more established or lower cost therapeutic alternatives are already available or subsequently become available. Third-party payors may refuse to include a particular branded product in their formularies or lists of medications for which third-party payors provide coverage and reimbursement, or otherwise restrict patient access through formulary controls or otherwise to a branded product when a less costly generic equivalent or alternative is available. Coverage may be more limited than the purposes for which a product is approved by the FDA or similar regulatory authorities outside the United States.

Assuming that we obtain coverage for a given product, the resulting reimbursement rates might not be adequate to cover our costs, including research, development, manufacture, sale and distribution, or achieve or sustain profitability, or may require co-payments that patients find unacceptably high. Patients are unlikely to use our products unless coverage is provided and reimbursement is adequate to cover a significant portion of the cost of our product candidates. Increasingly, third-party payors are requiring that pharmaceutical companies provide them with predetermined discounts from list prices and are challenging the prices charged for products. There is significant uncertainty related to insurance coverage and reimbursement of newly approved products. It is difficult to predict at this time what third-party payors will decide with respect to the coverage and reimbursement for our product candidates

In the United States, no uniform policy of coverage and reimbursement for products exists among third-party payors. Therefore, coverage and reimbursement for a product can differ significantly from payor to payor. As a result, obtaining and maintaining coverage and reimbursement for a product from a government or other third-party payor is a time-consuming and costly process that could require us to provide supporting scientific, clinical and cost-effectiveness data for the use of our products to each payor separately, with no assurance that adequate coverage and reimbursement will be applied consistently or obtained in the first instance.

Governmental and third-party payors in the United States and abroad are developing increasingly sophisticated methods of controlling healthcare costs. Further, we believe that future coverage and reimbursement will likely be subject to increased restrictions both in the United States and in international markets. Third-party coverage and reimbursement for our product candidates for which we may receive regulatory approval may not be available, limited, or adequate in either the United States or international markets.

Risks Related to our Financial Results

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

Since inception, we have incurred significant operating losses. Our net loss was $28.1 million for the year ended December 31, 2015, $59.7 million for the year ended December 31, 2016 and $37.1 million for the year ended December 31, 2017. As of December 31, 2017, we had an accumulated deficit of $160.2 million. As a result of our historical operating losses and expected future negative cash flows from operations, we have concluded that there is substantial doubt about our ability to continue as a going concern. Similarly, the report of our independent registered public accounting firm on our December 31, 2017 financial statements includes an explanatory paragraph indicating that there is substantial doubt about our ability to continue as a going concern. To date, we have financed our operations primarily through the sale of our securities in public offerings, private placements of our preferred stock, convertible notes and proceeds from government research contracts and grants. We also received an upfront payment following the execution of a license agreement for the exclusive right to develop, use and sell SB204 in certain topical dosage forms in Japan for the treatment of acne vulgaris. We have devoted substantially all of our efforts to research and development, including clinical trials. We have not completed development of any product candidates. We expect to continue to incur significant expenses and operating losses for at least the next several years. We anticipate that we will continue to incur substantial expenses if and as we:

- continue to conduct clinical trials for our existing clinical stage product candidates;
- initiate clinical trials for other future product candidates and new chemical entities;
- seek regulatory approvals for our product candidates that complete clinical trials;

- qualify contract manufacturing organizations for the manufacture of drug product for the commercial launch of our product candidates;
- establish a sales, marketing and distribution infrastructure to commercialize products for which we may obtain regulatory approval;
- maintain, expand and protect our intellectual property portfolio;
- continue our research and development efforts;
- exercise any development or commercialization rights we may have under any arrangements with collaborators or partners;
- hire additional clinical, quality control, scientific and management personnel;
- add executive, operational, financial and management information systems and personnel;
- incur costs associated with our securities litigation, and the outcome of that litigation; and
- incur additional legal, accounting and other expenses in operating as a public company.

To become and remain profitable, we must develop and eventually commercialize a product or products with significant market potential. This development and commercialization will require us to be successful in a range of challenging activities, including successfully completing clinical trials of our product candidates, obtaining regulatory approval for these product candidates, and marketing and selling those products for which we may obtain regulatory approval. We are only in the preliminary stages of some of these activities. We may never succeed in these activities and may never generate revenues that are significant or large enough to achieve profitability.

Even if we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our failure to become and remain profitable would decrease the value of the company and could impair our ability to raise capital, expand our business, maintain our research and development efforts or continue our operations. A decline in the value of our company could also cause you to lose all or part of your investment.

Our ability to utilize our net operating loss, or NOL, carryforwards may be limited.

As of December 31, 2017, we had NOL carryforwards available to reduce future taxable income, if any, for federal and state income tax purposes of $140.5 million and $142.4 million, respectively. If not utilized, the federal and state NOL carryforwards will begin expiring in 2028 and 2023 for federal and state tax purposes, respectively. Our ability to utilize NOL carryforward amounts to reduce taxable income in future years may be limited for various reasons, including if future taxable income is insufficient to recognize the full benefit of such NOL carryforward amounts prior to their expiration. Additionally, our ability to fully utilize these U.S. tax assets can also be adversely affected by "ownership changes" within the meaning of Section 382 of the Internal Revenue Code of 1986, as amended, or the Code, in a three-year period. Any ownership change is generally defined as a greater than 50% increase in equity ownership by "5% stockholders," as that term is defined for purposes of Section 382 of the Code in any three-year period. Although we have not completed a full analysis under Section 382, our initial public offering, or IPO, combined with our public offering in January 2018 may have resulted in an ownership change as defined in Section 382. Further, we may experience an ownership change in the future as a result of further shifts in our stock ownership. As a result, if we earn net taxable income, our ability to use our pre-change NOL carryforwards to offset U.S. federal taxable income may be subject to limitations, which could potentially result in increased future tax liability to us. In addition, at the state level, there may be periods during which the use of NOL carryforwards is suspended or otherwise limited, which could accelerate or permanently increase state taxes owed.

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

Until such time, if ever, as we can generate substantial product revenues, we expect to finance our cash needs through a combination of equity offerings, debt financings, government contracts, government and other third-party grants or other third-party funding from research, development and manufacturing service contracts, marketing and distribution arrangements and other collaborations, strategic alliances and licensing arrangements. We will require

substantial funding to fund our operating expenses and other activities. To the extent that we raise additional capital through the sale of equity or convertible debt securities, or if we agree to grant warrants or issue other equity to our strategic partners in connection with collaboration arrangements, our existing stockholders' ownership interests will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect our existing stockholders' rights. 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.

We have collaborated and intend to collaborate further with third parties for the development and commercialization of our product candidates. If we raise additional funds through government or other third-party funding, 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, future revenue streams, research programs or product candidates or to grant licenses on terms that may not be favorable to us. For example, we have entered into an exclusive license agreement with Sato relating to SB204 for the treatment of acne vulgaris in Japan.

The issuance of shares upon exercise of our outstanding warrants and options may cause substantial dilution to our existing stockholders and reduce the trading price of our common stock.

We have outstanding and exercisable warrants and options that if exercised may result in dilution to the interests of other stockholders and may reduce the trading price of our common stock. We presently have 10 million warrants outstanding and exercisable with an exercise price of $4.66 per share. In addition, we had approximately 0.7 million outstanding and exercisable options as of December 31, 2017 with a weighted average exercise price of $7.76 per share.

The report of our independent registered public accounting firm on our 2017 consolidated financial statements contains an explanatory paragraph regarding going concern, and we will need additional financing to execute our business plan, to fund our operations and to continue as a going concern.

Since inception, we have experienced recurring operating losses and negative cash flows and we expect to continue to generate operating losses and consume significant cash resources in the foreseeable future. These conditions raise substantial doubt about our ability to continue as a going concern without additional financing. As a result, our independent registered public accounting firm included an explanatory paragraph in its report on our 2017 consolidated financial statements with respect to this uncertainty. Substantial doubt about our ability to continue as a going concern may materially and adversely affect the price per share of our common stock and we may have a more difficult time obtaining financing.

We have prepared our consolidated financial statements on a going concern basis, which contemplates the realization of assets and the satisfaction of liabilities and commitments in the normal course of business. Our 2017 consolidated financial statements do not include any adjustments to reflect the possible future effects on the recoverability and classification of assets or the amounts and classification of liabilities that may result from the outcome of this uncertainty.

We have a limited operating history and no history of commercializing drugs, which may make it difficult for you to evaluate the success of our business to date and to assess our future viability.

We commenced operations in 2006, and our operations to date have been largely focused on developing our Nitricil technology and platform of product candidates. We have not yet demonstrated our ability to obtain regulatory approvals, manufacture a drug on a commercial scale, or arrange for a third-party to do so on our behalf, or conduct sales and marketing activities necessary for successful commercialization. Consequently, any predictions you make about our future success or viability may not be as accurate as they could be if we had a longer operating history or a history of successfully developing and commercializing drugs.

We may encounter unforeseen expenses, difficulties, complications, delays and other known or unknown factors in achieving our business objectives. We will need to transition at some point from a company with a development focus to a company capable of supporting commercial activities. We may not be successful in such a transition.

We may be adversely affected by natural disasters and other catastrophic events, and by man-made problems such as terrorism, that could disrupt our business operations and our business continuity and disaster recovery plans may not adequately protect us from a serious disaster.

Our corporate headquarters are located in Morrisville, North Carolina, near major hurricane and tornado zones. If a disaster, power outage or other event occurred that prevented us from using all or a significant portion of our headquarters, that damaged critical infrastructure, such as enterprise financial systems, manufacturing resource planning or enterprise quality systems, or that otherwise disrupted operations, it may be difficult or, in certain cases, impossible for us to continue our business for a substantial period of time. Our manufacturers' and suppliers' facilities are located in multiple locations, where other natural disasters or similar events, such as blizzards, tornadoes, fires, explosions or large-scale accidents or power outages, could severely disrupt their operations. In addition, acts of terrorism and other geo-political unrest could cause disruptions in our business or the businesses of our collaborators, manufacturers or the economy as a whole. All of the aforementioned risks may be further increased if we do not implement a disaster recovery plan or our collaborators' or manufacturers' disaster recovery plans prove to be inadequate. Any of the above could result in delays in the regulatory approval, manufacture, distribution or commercialization of our product candidates.

Risks Related to Manufacturing and our Reliance on Third Parties

We may not be successful in continuing to establish development and commercialization collaborations, which could adversely affect, and potentially prohibit, our ability to develop our product candidates.

We may continue to enter into strategic partnerships with third parties to develop and commercialize our product candidates. There can be no assurance that we will be able to establish such collaborations on favorable terms, if at all, or that our current or future collaborative arrangements will be successful. If we are unable to reach successful agreements with suitable collaborators for our product candidates, we would face significant incremental costs, we may be required to limit the scope and number of our product candidates we can commercially develop or the territories in which we commercialize them or we might fail to commercialize products or programs for which a suitable collaborator cannot be found. Our current and future collaboration partners may not dedicate sufficient resources to the development and commercialization of our product candidates or may otherwise fail in their development and commercialization due to factors beyond our control. If we fail to achieve successful collaborations, we may incur additional product development and commercialization expenses and our operating results and financial condition will be materially and adversely affected. If we breach or fail to comply with any provision of a collaboration agreement, a collaborator may have the right to terminate, in whole or in part, such agreement or to seek damages. Some of our collaboration agreements are complex and involve sharing of certain data, know-how and intellectual property rights amongst the parties. Additionally, these potential collaborators may not accept the transfer of critical methods and processes in order for development and commercialization work for our drug product candidates to take place. Our collaborators could interpret certain provisions differently than we do, which could lead to unexpected or inadvertent disputes with our collaborators. Any one of our collaborators could breach covenants or restrictions in our agreements, leading us into disputes and potential breaches of our agreements with other collaborators.

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

We currently do not have the ability to independently conduct preclinical studies that comply with the regulatory requirements known as good laboratory practice, or GLP, requirements. We also do not currently have the ability to independently conduct any clinical trials. The FDA and regulatory authorities in other jurisdictions require us to comply with regulations and standards, commonly referred to as good clinical practice, or GCP, requirements for conducting, monitoring, recording and reporting the results of clinical trials, in order to ensure that the data and results are scientifically credible and accurate and that the trial subjects are adequately informed of the potential risks of participating in clinical trials. We rely on medical institutions, clinical investigators, contract laboratories and other third parties, such as CROs, to conduct GLP-compliant preclinical studies and GCP-compliant clinical trials on our product candidates properly and on time. While we will have agreements governing their activities, we control only certain aspects of their activities and have limited influence over their actual performance. The third parties with whom we contract for execution of our GLP preclinical studies and our GCP clinical trials play a

significant role in the conduct of these studies and trials and the subsequent collection and analysis of data. These third parties are not our employees and, except for restrictions imposed by our contracts with such third parties, we have limited ability to control the amount or timing of resources that they devote to our programs. Although we rely on these third parties to conduct our GLP-compliant preclinical studies and GCP-compliant clinical trials, we remain responsible for ensuring that each of our GLP preclinical studies and GCP clinical trials is conducted in accordance with its investigational plan and protocol and applicable laws and regulations, and our reliance on the third parties does not relieve us of our regulatory responsibilities. In addition, if any of our third parties terminate their involvement with us for any reason, we may not be able to enter into similar arrangements with alternative third parties within a short period of time or do so on commercially reasonable terms.

Many of the third parties with whom we contract may also have relationships with other commercial entities, including our competitors, for whom they may also be conducting clinical trials or other drug development activities that could harm our competitive position. In addition, since the number of qualified clinical investigators is limited, we expect to conduct some of our clinical trials at the same clinical trial sites that some of our competitors use, which will reduce the number of patients who are available for our clinical trials in such clinical trial site. If the third parties conducting our GLP preclinical studies or our GCP clinical trials do not perform their contractual duties or obligations, experience work stoppages, do not meet expected deadlines, terminate their agreements with us or need to be replaced, or if the quality or accuracy of the clinical data they obtain is compromised due to their failure to adhere to our clinical trial protocols, GLPs or GCPs, or for any other reason, we may need to enter into new arrangements with alternative third parties. This could be difficult, costly or impossible, and our preclinical studies or clinical trials may need to be extended, delayed, terminated or repeated. As a result, we may not be able to obtain regulatory approval in a timely fashion, or at all, for the applicable product candidate, our financial results and the commercial prospects for our product candidates would be harmed, our costs could increase, and our ability to generate revenues could be delayed.

In addition, principal investigators for our clinical trials may serve as scientific advisors or consultants to us from time to time and may receive cash or equity compensation in connection with such services. If these relationships and any related compensation result in perceived or actual conflicts of interest, or the FDA concludes that the financial relationship may have affected the interpretation of the trial, the integrity of the data generated at the applicable clinical trial site may be questioned and the utility of the clinical trial itself may be jeopardized, which could result in the delay or rejection by the FDA of any NDA we submit. Any such delay or rejection could prevent us from commercializing our future product candidates.

Unexpected results in the analysis of raw materials, the API or drug product or problems with the quality systems supporting analytical work could adversely affect our development and commercialization timelines and result in increased costs of our development programs.

We currently rely on third-parties to test most of the raw materials necessary to produce the API and drug products we require. It is a regulatory requirement that raw materials are tested and there are a limited number of suppliers for testing these raw materials. There may be a need to assess alternate suppliers to prevent a possible disruption of the supply of these raw materials for the manufacture of API or drug product. Additionally, the analytical equipment used by these third-parties must be maintained and operational. With future third-party testing of raw materials, we do not have any control over the process or timing of their testing work. Additionally, if the results do not meet specifications, then obtaining additional raw materials may jeopardize the start or overall conduct of preclinical studies and clinical trials which could result in the delay of developing or commercializing our future product candidates.

We currently perform internal tests to ensure the API and drug product meets our quality specifications. The analytical equipment we use to perform these tests must be maintained, qualified and operational. If there are equipment problems or if the results of the analytical testing do not meet our quality specifications, then manufacturing additional API or drug product may increase costs and may jeopardize the start or overall conduct of preclinical studies and clinical trials which could result in the delay of developing or commercializing our future product candidates.

Unexpected delays in our ability to manufacture our NVN1000 API, or any other Nitricil NCEs, in our facility, for support of our development activities could adversely affect our development and commercialization timelines and result in increased costs of our development programs.

We currently manufacture the NVN1000 API, one of our Nitricil NCEs, for all of our product candidates at our facility in Morrisville, North Carolina. We have a limited number of personnel that have experience in drug substance manufacturing and who possess the expertise necessary to manufacture NVN1000. If our facility were to sustain significant damage, or if we had significant attrition in our manufacturing personnel, or if we have substantial problems with our equipment, our manufacturing operations could be delayed for an extended period of time. If our existing inventories of API are depleted, we may be unable to supply necessary materials for preclinical studies and clinical trials, causing longer timelines, increased costs and delays in the development and commercialization of drug products, if approved by the FDA or other regulatory authorities.

Further, the FDA requires API to be manufactured in accordance with current good manufacturing practices, or cGMP. Our facilities have been audited for cGMP compliance. In addition, our NCE manufacturing processes and operating conditions have been evaluated and tested by qualified vendors to ensure a safe operating environment. These tests include raw materials and product handling, process chemistry, air quality and waste disposal and containment. However, if our facilities are found to be noncompliant with applicable regulatory requirements, we may be required to take remedial actions, causing further delays and increased costs.

Failure to qualify and contract with third party manufacturers or failure of those third parties to provide us with sufficient quantities of API at acceptable quality levels or prices, could adversely impact our development and commercialization of any of our product candidates or result in our breaching our obligations to others.

While we currently manufacture the API in our own facilities, we intend to identify and qualify third parties to manufacture the API for our own use and intend to rely on them for API that we may provide to others for development and commercial purposes. The facilities used by our future contract manufacturers to manufacture our API must be approved by the FDA pursuant to inspections that will be conducted after we submit our NDA to the FDA. We do not control the manufacturing process of, and are completely dependent on, our contract manufacturing partners for compliance with the regulatory requirements, known as cGMP. If our contract manufacturers cannot successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the FDA or others, they will not be able to secure or maintain regulatory approval for their manufacturing facilities. In addition, we have no control over the ability of our contract manufacturers to maintain adequate quality control, quality assurance and qualified personnel. If the FDA or a comparable foreign regulatory authority does not approve these facilities for the manufacture of our API or if it withdraws any such approval in the future, we may need to find alternative manufacturing facilities, which would significantly impact our ability to develop, obtain regulatory approval for or market our product candidates, if approved.

We currently manufacture clinical trial materials internally and we intend to qualify and contract with third parties to manufacture clinical trial materials and commercial supplies of any approved product candidates. If we do not have sufficient quantities of clinical trial materials at acceptable quality levels, it could adversely impact our development and commercialization of any of our product candidates or result in our breaching our obligations to others.

We currently have the infrastructure and capability internally to manufacture clinical trial materials. However, we currently lack the resources and the capability to manufacture any of our product candidates on a commercial scale. While we currently manufacture the clinical trial materials in our own facilities, we intend to identify and qualify third parties to manufacture the finished drug product for our own use and intend to rely on them for finished drug products that we may provide to others for development and commercial purposes. If the FDA or a comparable foreign regulatory authority does not approve these facilities for the manufacture of our product candidates or if it withdraws any such approval in the future, we may need to find alternative manufacturing facilities, which would significantly impact our ability to develop, obtain regulatory approval for or market our product candidates, if approved.

We currently intend to manufacture certain drug products in-house, including compounding, formulation and primary packaging for our clinical trials. We currently contract with multiple labeling and packaging materials suppliers for our drug products. If we or our labeling and packaging materials suppliers were unable to manufacture and provide the necessary drug product supplies to conduct our clinical trials, we may not be able to contract with another third party in a timely manner to meet our product candidate specifications and supply needs. As a result, we could experience delays in the development and commercialization timelines of our product candidates, as well as increased costs. Furthermore, we expect to continue to depend on internal capabilities and third-party suppliers of raw materials for the foreseeable future. See risks related to third party suppliers described below.

If future third party manufacturers are unable to perform the required technology transfer of the manufacturing processes and analytical methods for drug product development and commercial manufacturing under cGMP guidelines and regulations, we could experience delays in the development and commercialization timelines of our product candidates, as well as increased costs. Further, while we intend to contract with third party manufacturers for clinical trial materials and prior to commercial launch in order to ensure that we maintain adequate supplies of finished drug product, we may be unable to enter into such agreements or do so on commercially reasonable terms.

We rely on third parties to supply raw materials necessary to manufacture our API and drug products. If these third parties do not successfully carry out their contractual duties or meet expected deadlines for raw materials, we may be unable to manufacture API or drug product which could jeopardize the start of preclinical studies or clinical trials and potentially delay or cause failure to obtain regulatory approval for or commercialize any of our product candidates.

We rely on third-party suppliers for the raw materials necessary to produce the API and drug products we require. There are a limited number of suppliers for raw materials, including nitric oxide, that are used in the manufacture of our product candidates, drugs (once approved by the FDA or comparable regulatory authority) or the drug products we supply to others, and there may be a need to assess alternate suppliers to prevent a possible disruption of the manufacture of the materials, importantly nitric oxide, necessary to produce our product candidates for our clinical trials, and if approved, ultimately for commercial sale, or to satisfy our obligations to others. We have not entered into long-term agreements with our current suppliers or with any alternate suppliers. We currently obtain our raw material supplies for finished drug products through individual purchase orders. With future third-party manufacturers of our product candidates, we do not have any control over the process or timing of the acquisition of these raw materials. Moreover, we currently do not have any agreements for the commercial production of these raw materials, including nitric oxide. Although we generally do not begin a clinical trial unless we believe we have a sufficient supply of a product candidate to complete the clinical trial, any significant delay in the supply of the raw material components to manufacture drug products for an ongoing clinical trial due to the need to replace a raw material supplier could considerably delay completion of our clinical trials, product testing and potential regulatory approval of our product candidates. If we or our future third party manufacturers are unable to purchase these raw materials, including nitric oxide, after regulatory approval has been obtained for our product candidates, the commercial launch of our product candidates would be delayed or there would be a shortage in supply, which would impair our ability to generate revenues from the sale of our product candidates.

Our employees, independent contractors, principal investigators, CROs, consultants, commercial partners and vendors may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements, which could expose us to liability and hurt our reputation.

We are exposed to the risk that our employees, independent contractors, principal investigators, CROs, consultants, commercial partners and vendors may engage in fraudulent conduct or other illegal activity. Misconduct by these parties could include intentional, reckless or negligent conduct or disclosure of unauthorized activities to us that violates: (i) FDA laws and regulations, including those laws that require the reporting of true, complete and accurate information to the FDA, (ii) manufacturing standards, (iii) federal, state and foreign data privacy, security, fraud and abuse and other healthcare laws, or (iv) laws that require the true, complete and accurate reporting of financial information or data. Activities subject to these laws also involve the improper use or misrepresentation of information obtained in the course of clinical trials, creating fraudulent data in our preclinical studies or clinical trials or illegal misappropriation of drug product, which could result in regulatory sanctions and cause serious harm to our reputation. It is not always possible to identify and deter misconduct by employees and other third parties, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or

unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to be in compliance with such laws or regulations. Additionally, we are subject to the risk that a person or government could allege such fraud or other misconduct, even if none occurred. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business and financial results, including, without limitation, the imposition of significant civil, criminal and administrative penalties, damages, monetary fines, possible exclusion from participation in Medicare, Medicaid and other federal healthcare programs, reputational harm, diminished profits and future earnings, and curtailment of our operations.

Risks Related to Our Operations

Our business involves the use of hazardous materials and we and our third-party suppliers and manufacturers must comply with environmental laws and regulations, which can be expensive and restrict how we do business.

The manufacturing activities of our third-party suppliers and manufacturers involve the controlled storage, use and disposal of hazardous materials owned by us, including the components of our product candidates such as nitric oxide and other hazardous compounds. We and our manufacturers and suppliers are subject to laws and regulations governing the use, manufacture, storage, handling and disposal of these hazardous materials. In some cases, these hazardous materials and various wastes resulting from their use are stored at our suppliers' or manufacturers' facilities pending use and disposal. We and our suppliers and manufacturers cannot completely eliminate the risk of contamination, which could cause an interruption of our commercialization efforts, research and development efforts and business operations, injury to our service providers and others and environmental damage resulting in costly clean-up and liabilities under applicable laws and regulations governing the use, storage, handling and disposal of these materials and specified waste products. Although we believe that the safety procedures utilized by our third-party suppliers and manufacturers for handling and disposing of these materials generally comply with the standards prescribed by these laws and regulations, we cannot guarantee that this is the case or eliminate the risk of accidental contamination or injury from these materials. In such an event, we may be held liable for any resulting damages and such liability could exceed our financial resources.

We specialize solely in developing nitric oxide-based topical therapeutics for dermatological and oncovirus-mediated diseases, and if we do not successfully achieve regulatory approval for any of our product candidates or successfully commercialize them, we may not be able to continue as a business.

All of our clinical development efforts to date have focused on the development of nitric oxide-based topical therapies. There can be no assurance that the intended or anticipated results from the use of nitric oxide-based therapies will be reaped, and that we will successfully bring our product candidates to market. Because all of our current product candidates are based on nitric oxide and our Nitricil technology, the failure of our Nitricil technology to be safe or efficacious generally will have adverse implications for our entire product candidate pipeline. If, for any reason, our intended use of nitric oxide does not materialize, we may not be able to redeploy our resources to alternative components or raw materials, efficiently or at all.

Changes to our leadership team could prove disruptive to our operations and have adverse consequences for our business and operating results.

We are currently conducting a search for a permanent chief executive officer and permanent chief financial officer. Managing transitions in our executive leadership team may divert our existing management team's attention from our core operations, and the recent transitions we have experienced may make it more difficult for us to identify a permanent chief executive officer or permanent chief financial officer or to retain existing employees. If we are unable to timely locate successors for key management positions, it may negatively impact our business. In addition, the recent transitions we have experienced have increased our dependency on the remaining members of the senior executive team and other key employees within the organization. We have incurred costs related to transitions in our management team, including severance payments, and expect to incur recruitment costs related to the hiring of new executives from time to time.

Our business and operations would suffer in the event of computer system failures, cyber-attacks or deficiencies in our cyber-security.

Despite the implementation of security measures, our internal computer systems, and those of third parties on which we rely, are vulnerable to damage from computer viruses, malware, natural disasters, terrorism, war, telecommunication and electrical failures, cyber-attacks or cyber-intrusions over the Internet, attachments to emails, persons inside our organization, or persons with access to systems inside our organization. The risk of a security breach or disruption, particularly through cyber-attacks or cyber intrusion, including by computer hackers, foreign governments, and cyber terrorists, has generally increased as the number, intensity and sophistication of attempted attacks and intrusions from around the world have increased. If such an event were to occur and cause interruptions in our operations, it could result in a material disruption of our product development programs. For example, the loss of clinical trial data from completed or 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 was to result in a loss of or damage to our data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur material legal claims and liability, and damage to our reputation, and the further development of our product candidates could be delayed.

Our disclosure controls and procedures address cybersecurity and include elements intended to ensure that there is an analysis of potential disclosure obligations arising from security breaches. We also maintain compliance programs to address the potential applicability of restrictions against trading while in possession of material, nonpublic information generally and in connection with a cyber-security breach. However, a breakdown in existing controls and procedures around our cyber-security environment may prevent us from detecting, reporting or responding to cyber incidents in a timely manner and could have a material adverse effect on our financial position and value of the Company's stock.

We may experience significant future growth which may adversely disrupt our operations.

As of December 31, 2017, we had 58 full-time employees and one part-time employee. As our development progresses, we may experience significant growth in the number of our employees and the scope of our operations, particularly in the area of product development and, if any of our product candidates receives marketing approval, sales, marketing and distribution. To manage our anticipated future growth, we must continue to implement and improve our managerial, operational and financial systems, expand our facilities and continue to recruit and train additional qualified personnel. Due to our limited financial resources and the limited experience of our management team in managing a company with such anticipated growth, we may not be able to effectively manage the expansion of our operations or recruit and train additional qualified personnel. The expansion of our operations may lead to significant costs and may divert our management and business development resources. Any inability to manage growth could delay the execution of our business plans or disrupt our operations.

Risks Related to Government Regulation

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

Any regulatory approvals that we receive for our product candidates may be subject to limitations on the approved indicated uses for which the product may be marketed or the conditions of approval or contain requirements for potentially costly post-market testing and surveillance to monitor the safety and efficacy of the product candidate. The FDA may also require a REMS as a condition of approval of our product candidates, which could include requirements for a medication guide, physician communication plans or additional elements to ensure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. In addition, if the FDA or a comparable foreign regulatory authority approves our product candidates, the manufacturing processes, labeling, packaging, distribution, adverse event reporting, storage, advertising, promotion, import, export and recordkeeping for our product candidates will be subject to extensive and ongoing regulatory requirements. These requirements include submissions of safety and other post-marketing information and reports, registration, as well as continued compliance with cGMPs and GCP requirements for any clinical trials that we conduct post-approval. Later discovery of previously unknown problems with our product candidates, including adverse events of unanticipated

severity or frequency, or with our third-party manufacturers or manufacturing processes, or failure to comply with regulatory requirements, may result in, among other things:

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

The FDA's and other regulatory authorities' policies may change and additional government regulations may be enacted that could prevent, limit or delay regulatory approval of our product candidates. For example, in December 2016, the 21st Century Cures Act, or Cures Act, was signed into law. The Cures Act, among other things, is intended to modernize the regulation of drugs and spur innovation, but its ultimate implementation remains unclear. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may fail to obtain any marketing approvals, lose any marketing approval that we may have obtained and we may not achieve or sustain profitability.

We also cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative action, either in the United States or abroad. For example, certain policies of the Trump administration may impact our business and industry. Namely, the Trump administration has taken several executive actions, including the issuance of a number of executive orders, that could impose significant burdens on, or otherwise materially delay, the FDA's ability to engage in routine regulatory and oversight activities such as implementing statutes through rulemaking, issuance of guidance, and review and approval of marketing applications. An under-staffed FDA could result in delays in FDA's responsiveness or in its ability to review submissions or applications, issue regulations or guidance or implement or enforce regulatory requirements in a timely fashion or at all. It is difficult to predict how these actions will be implemented, and the extent to which they will impact the FDA's ability to exercise its regulatory authority. If these executive actions impose constraints on FDA's ability to engage in oversight and implementation activities in the normal course, our business may be negatively impacted. In addition, if we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may lose any marketing approval that we may have obtained and we may not achieve or sustain profitability.

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

In the United States and some foreign jurisdictions, there have been, and we expect there will continue to be, a number of legislative and regulatory changes and proposed changes regarding the healthcare system that could prevent or delay marketing approval of our product candidates, restrict or regulate post-approval activities and affect our ability to profitably sell any product candidates for which we obtain marketing approval.

For example, in the United States, in 2010, President Obama signed into law the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, or collectively the ACA, a sweeping law intended to broaden access to health insurance, reduce or constrain the growth of healthcare spending, enhance remedies against fraud and abuse, add new transparency requirements for the healthcare and health insurance industries, impose new taxes and fees on the health industry and impose additional health policy reforms. Among the provisions of the ACA of importance to our potential product candidates are the following:

- an annual, nondeductible fee payable by any entity that manufactures or imports specified branded prescription drugs and biologic agents;
- an increase in the statutory minimum rebates a manufacturer must pay under the Medicaid Drug Rebate Program;

- a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted or injected;
- a new Medicare Part D coverage gap discount program, in which manufacturers must agree to offer 50% point-of-sale discounts off negotiated prices of applicable brand drugs to eligible beneficiaries under their coverage gap period, as a condition for the manufacturer's outpatient drugs to be covered under Medicare Part D;
- extension of manufacturers' Medicaid rebate liability to individuals enrolled in Medicaid managed care organizations;
- expansion of eligibility criteria for Medicaid programs;
- expansion of the entities eligible for discounts under the Public Health Service pharmaceutical pricing program;
- a new requirement to annually report drug samples that manufacturers and distributors provide to physicians; and
- a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in and conduct comparative clinical effectiveness research, along with funding for such research.

Since its enactment, there have been judicial and Congressional challenges to certain aspects of the ACA. We expect that the current presidential administration and U.S. Congress will likely continue to seek to modify, repeal, or otherwise invalidate all, or certain provisions of, the Affordable Care Act. The impact that President Trump's administration and the U.S. Congress may have, if any, is uncertain, and any changes will likely take time to unfold, and could have an impact on coverage and reimbursement for healthcare items and services covered by plans that were authorized by the Affordable Care Act.

In addition, other legislative changes have been proposed and adopted in the U.S. since the ACA was enacted. These changes included aggregate reductions to Medicare payments to providers of up to 2% per fiscal year, which went into effect in April 2013 and, due to the Bipartisan Budget Act of 2015, will remain in effect through 2025 unless additional action is taken by Congress. In January 2013, President Obama signed into law the American Taxpayer Relief Act of 2012, which, among other things, further reduced Medicare payments to several types of providers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. These new laws may result in additional reductions in Medicare and other healthcare funding. In addition, recently there has been heightened governmental scrutiny over the manner in which manufacturers set prices for their commercial products, which has resulted in several Congressional inquiries and proposed bills designed to, among other things, reform government program reimbursement methodologies.

We expect that the ACA, as well as other healthcare reform measures that may be adopted in the future, may result in additional reductions in Medicare and other healthcare funding, more rigorous coverage criteria, new payment methodologies and in additional downward pressure on the price that we receive for any approved product. Any reduction in reimbursement from Medicare or other government programs may result in a similar reduction in payments from private payors. The implementation of cost containment measures or other healthcare reforms may prevent us from being able to generate revenue, attain profitability, or commercialize our product candidates, if approved.

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

We are subject to governmental economic sanctions and export and import controls that could impair our ability to compete in international markets or subject us to liability if we are not in compliance with applicable laws.

As a U.S. company, we are subject to U.S. import and export controls and economic sanctions laws and regulations, and we are required to import and export our product candidates, technology and services in compliance with those laws and regulations, including the U.S. Export Administration Regulations, the International Traffic in Arms Regulations, and economic embargo and trade sanction programs administered by the Treasury Department's Office of Foreign Assets Control.

U.S. economic sanctions and export control laws and regulations prohibit the shipment of certain products and services to countries, governments and persons targeted by U.S. sanctions. While we are currently taking precautions to prevent doing any business, directly or indirectly, with countries, governments and persons targeted by U.S. sanctions and to ensure that our product candidates, if approved, are not exported or used by countries, governments and persons targeted by U.S. sanctions, such measures may be circumvented.

Furthermore, if we export our product candidates, if approved, the exports may require authorizations, including a license, a license exception or other appropriate government authorization. Complying with export control and sanctions regulations for a particular sale may be time-consuming and may result in the delay or loss of sales opportunities. Failure to comply with export control and sanctions regulations for a particular sale may expose us to government investigations and penalties.

If we are found to be in violation of U.S. sanctions or import or export control laws, it could result in civil and criminal, monetary and non-monetary penalties, including possible incarceration for those individuals responsible for the violations, the loss of export or import privileges and reputational harm.

We are subject to anti-corruption and anti-money laundering laws with respect to our operations and non-compliance with such laws can subject us to criminal or civil liability and harm our business.

We are subject to the U.S. Foreign Corrupt Practices Act of 1977, as amended, or the FCPA, the U.S. domestic bribery statute contained in 18 U.S.C. § 201, the U.S. Travel Act, the USA PATRIOT Act and possibly other anti-bribery and anti-money laundering laws in countries in which we may conduct activities. Anti-corruption laws are interpreted broadly and prohibit companies and their employees and third-party intermediaries from authorizing, offering or providing, directly or indirectly, improper payments or benefits to recipients in the public or private sector. As we commercialize our product candidates and eventually commence international sales and business, we may engage with collaborators and third-party intermediaries to sell our products abroad and to obtain necessary permits, licenses and other regulatory approvals. We or our third-party intermediaries may have direct or indirect interactions with officials and employees of government agencies or state-owned or affiliated entities. We may be held liable for the corrupt or other illegal activities of these third-party intermediaries, our employees, representatives, contractors, partners and agents, even if we do not explicitly authorize such activities.

Noncompliance with anti-corruption and anti-money laundering laws could subject us to whistleblower complaints, investigations, sanctions, settlements, prosecution, other enforcement actions, disgorgement of profits, significant fines, damages, other civil and criminal penalties or injunctions, suspension or debarment from contracting with certain persons, the loss of export privileges, reputational harm, adverse media coverage and other collateral consequences. Responding to any action will likely result in a materially significant diversion of management's attention and resources and significant defense costs and other professional fees.

Recent U.S. tax legislation may adversely affect our financial condition, results of operations, and cash flows.

Recently enacted U.S. tax legislation has significantly changed the U.S. federal income taxation of U.S. corporations, including by reducing the U.S. corporate income tax rate, limiting interest deductions, permitting immediate expensing of certain capital expenditures, and revising the rules governing net operating losses and foreign tax credits. Many of these changes are effective immediately, without any transition periods or grandfathering for existing transactions. The legislation is unclear in many respects and could be subject to potential amendments and technical corrections, as well as interpretations and implementation regulations by the U.S. Department of the Treasury and Internal Revenue Service, any of which could materially affect the impacts of the

legislation. In addition, it is unclear how these U.S. federal income tax changes will affect state and local taxation, which often uses federal taxable income as a starting point for computing state and local tax liabilities. See Note 9—Income Taxes for additional information about our deferred tax assets.

While some of the changes made by the tax legislation may adversely affect us in one or more reporting periods and prospectively, other changes may be beneficial on a going forward basis. We continue to work with our tax advisors to determine the full impact of this legislation on us.

Risks Related to Our Intellectual Property

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

We rely upon a combination of patents, trade secret protection, and confidentiality agreements to protect the intellectual property related to our product candidates. Our success depends in large part on our ability to obtain and maintain patent protection in the United States and other countries with respect to our product candidates. We seek to protect our proprietary position by filing patent applications in the United States and abroad related to our product candidates.

The patent prosecution process is expensive and time-consuming, however, and we may not be able to file and prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner. It is also possible that we will fail to identify patentable aspects of our technology platform or product candidates before it is too late to obtain patent protection. We may not have the right to control the preparation, filing and prosecution of patent applications, or to maintain the rights to patents licensed to or from third parties. In particular, certain patents and patent applications covering our core technology platform are exclusively licensed from the University of North Carolina, or UNC, and under our license agreement with UNC, we rely on UNC to prosecute and maintain such patents and applications. Therefore, these patents and applications, and any other patents and applications that we may license from or to third parties, may not be prosecuted and enforced in a manner consistent with the best interests of our business.

If the patent applications we hold or have in-licensed with respect to our product candidates fail to issue, if their breadth or strength of protection is threatened, or if they fail to provide meaningful exclusivity for our current or any future product candidates, it could have a materially adverse effect on our business. Even if our owned and licensed patent applications issue as patents, they may not issue in a form that will provide us with any meaningful protection, prevent competitors from competing with us or otherwise provide us with any competitive advantage. Our competitors may be able to circumvent our owned and licensed patents by developing similar or alternative technologies or products in a non-infringing manner.

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

Recent patent reform legislation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents. On September 16, 2011, the Leahy-Smith America Invents Act, or the Leahy-Smith Act, was signed into law. The Leahy-Smith Act includes a number of significant changes to United States patent law. These include provisions that affect the way patent applications are prosecuted and may also affect patent litigation. The USPTO recently developed new regulations and procedures to govern administration of the Leahy-Smith Act, and many of the substantive changes to patent law associated with the Leahy-Smith Act, and in particular, the first to file provisions, only became effective on March 16, 2013. Accordingly, it is not clear what, if any, impact the Leahy-Smith Act will have on the operation of our business. However, the Leahy-Smith Act and its implementation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents, all of which could have an adverse effect on our business and financial condition. For example, the first to file system under the Leahy-Smith Act may incentivize companies like us in the biopharmaceutical industry to file patent applications as soon as possible, and filing applications as soon as possible runs the risk that the application will not have the supporting data to claim the broadest protection possible in the United States.

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

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

Finally, certain of our activities and our licensors' activities have been funded, and may in the future be funded, by the U.S. federal government. When new technologies are developed with U.S. federal government funding, the government obtains certain rights in any resulting patents, including a nonexclusive license authorizing the government to use the invention for non-commercial purposes. These rights may permit the government to disclose our confidential information to third parties and to exercise "march-in" rights to use or allow third parties to use our patented technology. The government can exercise its march-in rights if it determines that action is necessary because we fail to achieve practical application of the U.S. government-funded technology, because action is necessary to alleviate health or safety needs, to meet requirements of federal regulations or to give preference to U.S. industry. In addition, U.S. government-funded inventions must be reported to the government, U.S. government funding must be disclosed in any resulting patent applications, and our rights in such inventions may be subject to certain requirements to manufacture products in the United States.

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

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

in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. Non-compliance events that could result in abandonment or lapse of patent rights include, but are not limited to, failure to timely file national and regional stage patent applications based on our international patent application, failure to respond to official actions within prescribed time limits, non-payment of fees and failure to properly legalize and submit formal documents. If we or our licensors fail to maintain the patents and patent applications covering our technology platform or product candidates, our competitors might be able to enter the market, which would have an adverse effect on our business.

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

The United States has recently enacted and implemented wide-ranging patent reform legislation. The U.S. Supreme Court has ruled on several patent cases in recent years, either narrowing the scope of patent protection available in certain circumstances or weakening the rights of patent owners in certain situations. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents, once obtained. Depending on actions by the U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change in unpredictable ways that would weaken our ability to obtain new patents or to enforce patents that we have licensed or that we might obtain in the future.

We may be involved in lawsuits to protect or enforce our owned and licensed patents, which could be expensive, time-consuming and unsuccessful. Further, our issued patents could be found invalid or unenforceable if challenged in court.

If we were to initiate legal proceedings against a third-party to enforce a patent directed to our product candidates, or one of our future product candidates, the defendant could counterclaim that our patent is invalid or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including lack of novelty, obviousness, non-enablement or insufficient written description. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld relevant information from the USPTO or made a misleading statement during prosecution. Third parties may also raise similar claims before the USPTO, even outside the context of litigation. The outcome following legal assertions of invalidity and unenforceability is unpredictable. With respect to the validity question, for example, we cannot be certain that there is no invalidating prior art of which we and the patent examiner were unaware during prosecution. If a defendant were to prevail on a legal assertion of invalidity or unenforceability, we would lose at least part, and perhaps all, of the patent protection on our product candidates. Such a loss of patent protection would harm our business.

Interference proceedings provoked by third parties or brought by us or declared by the USPTO may be necessary to determine the priority of inventions with respect to our owned and licensed patents or patent applications. An unfavorable outcome could require us to cease using the related technology or to attempt to license rights to it from the prevailing party. Our business could be harmed if the prevailing party does not offer us a license on commercially reasonable terms, or at all.

Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation.

Most of our competitors are larger than we are and have substantially greater resources than we do. They are, therefore, likely to be able to sustain the costs of complex patent or other intellectual property rights litigation longer than we could. Accordingly, despite our efforts, we may not be able to prevent third parties from infringing upon or misappropriating our intellectual property. Litigation could result in substantial costs and diversion of management resources, which could harm our business. In addition, the uncertainties associated with litigation could compromise our ability to raise the funds necessary to continue our clinical trials, continue our internal research programs, or in-license needed technology or other product candidates. There could also be public announcements of the results of

the hearing, motions, or other interim proceedings or developments. If securities analysts or investors perceive those results to be negative, it could cause the price of shares of our common stock to decline.

We may not be able to protect our intellectual property rights throughout the world, which could impair our business.

Filing, prosecuting and defending patents on our product candidates in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States can be less extensive than those in the United States. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the United States. Consequently, we may not be able to prevent third parties from practicing our invention in such countries. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products and may export otherwise infringing products to territories where we have patent protection, but enforcement rights are not as strong as those in the United States. These products may compete with our product candidates and our owned and licensed patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of some countries do not favor the enforcement of patents and other intellectual property protection, which could make it difficult for us to stop the infringement of our owned and licensed patents generally. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly and our owned and licensed patent applications at risk of not issuing and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate, and the damages or other remedies awarded, if any, may not be commercially meaningful.

Many countries, including European Union countries, India, Japan and China, have compulsory licensing laws under which a patent owner may be compelled under specified circumstances to grant licenses to third parties. In those countries, we may have limited remedies if patents are infringed or if we are compelled to grant a license to a third party, which could materially diminish the value of those patents. This could limit our potential revenue opportunities. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

We may not be able to obtain licenses to third-party intellectual property. Third parties may initiate legal proceedings alleging infringement of their intellectual property rights.

A third party may hold intellectual property, including patent rights that are important or necessary to the development or commercialization of our product candidates. However, we may not be able to obtain such licenses on commercially reasonable terms, or at all. In addition, our existing licenses may be terminated or may not be renewed, which could hurt our business.

In addition, our commercial success depends upon our ability to develop, manufacture, market and sell our product candidates and use our proprietary technologies without infringing the proprietary rights of third parties. There is considerable intellectual property litigation in the biotechnology and pharmaceutical industries. We may become party to, or threatened with, future adversarial proceedings or litigation regarding intellectual property rights with respect to our products and technology, including interference or derivation proceedings before the USPTO. Numerous U.S. and foreign issued patents and pending patent applications owned by third parties exist in the fields in which we are developing our product candidates. As the biotechnology and pharmaceutical industries expand and more patents are issued, and as we gain greater visibility and market exposure as a public company, the risk increases that our product candidates or other business activities may be subject to claims of infringement of the patent and other proprietary rights of third parties. Third parties may assert infringement claims against us based on existing patents or patents that may be granted in the future. We have conducted searches for information in support of patent protection and otherwise evaluating the patent landscape for nitric oxide releasing materials and products, and, based on these searches and evaluations to date, we do not believe that there are valid patents which contain granted claims that could be asserted with respect to our nitric oxide-based product candidates.

Parties making claims against us may obtain injunctive or other equitable relief, which could effectively block our ability to further develop and commercialize one or more of our product candidates or force us to cease some of our business operations. Defense of these claims, regardless of their merit, would involve substantial litigation expense and would be a substantial diversion of employee resources from our business. If we are found to infringe a third party's intellectual property rights, we could be required to redesign our infringing products or obtain a license from such third party to continue developing and marketing our products and technology. However, we may not be able to obtain any required license on commercially reasonable terms or at all. Even if we were able to obtain a license, it could be non-exclusive, thereby giving our competitors access to the same technologies licensed to us. Moreover, we could be forced, including by court order, to cease commercializing the infringing technology or product. In addition, we could be found liable for monetary damages, including treble damages and attorneys' fees if we are found to have willfully infringed a patent. Claims that we have misappropriated the confidential information or trade secrets of third parties could have a similar negative impact on our business.

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

Many of our employees were previously employed at other biotechnology or pharmaceutical companies or universities. Although we try to ensure that our employees do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that these employees or we have used or disclosed intellectual property, including trade secrets or other proprietary information, of any such employee's former employer. Litigation may be necessary to defend against these claims.

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

If we fail in prosecuting or defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel. Even if we are successful in prosecuting or defending against such claims, litigation could result in substantial costs and be a distraction to management.

If we fail to comply with our obligations under any license, collaboration or other agreements, it could have a material adverse effect on our commercialization efforts for our product candidates.

Our current licenses impose, and any future licenses we enter into may impose, various development, commercialization, milestone, royalty, diligence, sublicensing, insurance, patent prosecution and enforcement, and other obligations on us. If we breach any of these obligations, or use the intellectual property licensed to us in an unauthorized manner, we may be required to pay damages and the licensor may have the right to terminate the license, which could result in us being unable to develop, manufacture and sell products that are covered by the licensed technology or enable a competitor to gain access to the licensed technology.

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

In addition to seeking patents for our product candidates, we also rely on trade secrets, including unpatented know-how, technology and other proprietary information, to maintain our competitive position.

We seek to protect our trade secrets, in part, by entering into non-disclosure and confidentiality agreements with parties who have access to them, such as our employees (including through specific provisions in employment contracts), corporate collaborators, outside scientific collaborators, contract manufacturers, consultants, advisors and other third parties. We also enter into confidentiality and invention or patent assignment agreements with our employees and consultants. Despite these efforts, any of these parties may breach the agreements and disclose our proprietary information, including our trade secrets, and we may not be able to obtain adequate remedies for such

breaches. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret is difficult, expensive and time-consuming, and the outcome is unpredictable. In addition, some courts inside and outside the United States are less willing or unwilling to protect trade secrets. If any of our trade secrets were to be lawfully obtained or independently developed by a competitor, we would have no right to prevent them, or those to whom they communicate it, from using that technology or information to compete with us. If any of our trade secrets were to be disclosed to or independently developed by a competitor, our competitive position would be materially impaired.

Our reliance on third parties requires us to share our trade secrets, which increases the possibility that a competitor will discover them or that our trade secrets will be misappropriated or disclosed.

Because we expect to rely on third parties to manufacture any of our current or future product candidates, we must, at times, share trade secrets with them. These agreements typically limit the rights of the third parties to use or disclose our confidential information, including our trade secrets. Despite the contractual provisions employed when working with third parties, the need to share trade secrets and other confidential information increases the risk that such trade secrets become known by our competitors, are inadvertently incorporated into the technology of others, or are disclosed or used in violation of these agreements. Given that our proprietary position is based, in part, on our know-how and trade secrets, a competitor's discovery of our trade secrets or other unauthorized use or disclosure would impair our competitive position and may adversely impact our business.

Any trademarks we have obtained or may obtain may be infringed or successfully challenged, materially harming to our business.

We expect to rely on trademarks as one means to distinguish any of our product candidates that are approved for marketing from the products of our competitors. Once we select new trademarks and apply to register them, our trademark applications may not be approved. Third parties may oppose or attempt to cancel our trademark applications or trademarks, or otherwise challenge our use of the trademarks. In the event that our trademarks are successfully challenged, we could be forced to rebrand our products, which could result in loss of brand recognition and could require us to devote resources to advertising and marketing new brands. Further, our competitors may infringe our trademarks, including with respect to our Nitricil technology and we may not have adequate resources to enforce our trademarks.

*Outside of the United States we cannot be certain that any country's patent or trademark office will not implement new rules that could seriously affect how we draft, file, prosecute and maintain patents, trademarks and patent and trademark applications***.**

We cannot be certain that the patent or trademark offices of countries outside the United States will not implement new rules that increase costs for drafting, filing, prosecuting and maintaining patents, trademarks and patent and trademark applications or that any such new rules will not restrict our ability to file for patent protection. For example, we may elect not to seek patent protection in some jurisdictions or for some product candidates in order to save costs. We may be forced to abandon or return the rights to specific patents due to a lack of financial resources.

Intellectual property rights do not necessarily address all potential threats to our competitive advantage.

The degree of future protection afforded by our intellectual property rights is uncertain because intellectual property rights have limitations, and may not adequately protect our business, or permit us to maintain our competitive advantage, for reasons including but not limited to the following:

- others may be able to make formulations or compositions that are the same as or similar to certain of our product candidates but that are not covered by the claims of the patents that we own or license;
- others may independently develop similar or alternative technologies or duplicate any of our technologies without infringing our trade secret or similar rights;
- issued patents that we own or license may not provide us with any competitive advantages, or may be held invalid or unenforceable as a result of legal challenges;

- our competitors might conduct research and development activities in the United States and other countries that provide a safe harbor from patent infringement claims for certain research and development activities, as well as in countries where we do not have patent rights, and then use the information learned from such activities to develop competitive products for sale in our major commercial markets; and
- we may not develop additional proprietary technologies that are patentable.

Risks Related to Our Common Stock

The price of our common stock may be volatile and fluctuate significantly, which could result in substantial losses for our existing stockholders.

Our stock price has in the past been, and is likely to be in the future, volatile. The stock market in general has experienced extreme volatility that has often been unrelated to the operating performance of particular companies. During the period from January 1, 2017 to December 31, 2017, the closing sales price of our common stock ranged from a high of $26.86 per share to a low of $3.82 per share. Our stock price experienced significant decline following the announcement of top-line results of our Phase 3 clinical trials of SB204 in late January 2017, and for the period from February 1, 2017 to December 31, 2017, the closing sales price of our common stock ranged from a high of $7.09 per share to a low of $3.82 per share. As a result of this volatility, our existing stockholders may not be able to sell their stock at a favorable price. The market price for our common stock may be influenced by many factors, including:

- actual or anticipated fluctuations in our financial condition and operating results;
- actual or anticipated changes in our growth rate relative to our competitors;
- potential competition from existing products or new products that may emerge;
- development of new technologies that may address our markets and may make our technology less attractive;
- changes in physician, hospital or healthcare provider practices that may make our product candidates less attractive;
- announcements by us, our partners or our competitors regarding significant acquisitions, strategic partnerships, joint ventures, collaborations or capital commitments;
- developments or disputes concerning proprietary rights, including patents, litigation matters and our ability to obtain patent protection for our technologies;
- the recruitment or departure of key personnel;
- failure to meet or exceed financial estimates and projections of the investment community or that we provide to the public;
- actual or anticipated changes in estimates as to financial results, development timelines or recommendations by securities analysts;
- variations in our financial results or those of companies that are perceived to be similar to us;
- changes to reimbursement levels by commercial third-party payors and government payors, including Medicare, and negative announcements relating to reimbursement levels;
- general economic, industry and market conditions; and
- the other factors described in this “Risk Factors” section.

In addition, the stock market in general and emerging growth companies in particular, have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of these companies. A certain degree of stock price volatility can be attributed to being a newly public company. These broad market and industry fluctuations may negatively impact the price or liquidity of our common stock, regardless

of our operating performance. Any actual or perceived negative operational developments or market or industry fluctuations may compound each other's negative impacts on the price of liquidity of our common stock.

We have been named as a defendant in putative securities class action lawsuits. These, and potential similar or related litigation, could result in substantial damages and may divert management's time and attention from our business.

As described in the section entitled "Legal Proceedings" in this Annual Report on Form 10-K, putative stockholder class action lawsuits have been filed against us and certain of our current and former directors and officers. These lawsuits were filed on behalf of a putative class of all persons who purchased or otherwise acquired our securities (1) pursuant or traceable to our IPO, or (2) on the open market during the period specified in the complaints. The lawsuits assert claims for violation of Sections 11 and 15 of the Securities Act of 1933 and Sections 10(b) and 20(a) of the Exchange Act and SEC Rule 10b-5 promulgated thereunder, in connection with statements related to our Phase 3 clinical trials of SB204. The complaints seek, among other things, an unspecified amount of compensatory damages and attorneys' fees and costs on behalf of the putative class. We believe that the claims lack merit and intend to defend the lawsuits vigorously, but there can be no assurance that a favorable resolution will be obtained in any of these matters. An unfavorable resolution in such lawsuits, whether by final judgment or an unfavorable settlement, could have a material adverse effect on our business, financial condition, results of operations and cash flows. Additionally, the actual cost of the litigation may be significant, and the litigation may divert management's time and attention from our business.

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

Our executive officers, directors and stockholders who owned more than 5% of our outstanding common stock and their respective affiliates, in the aggregate, hold shares representing approximately 32% of our outstanding voting common stock as of January 10, 2018, following the close of our recent public offering. As a result, if these stockholders were to choose to act together, they would be able to significantly influence matters submitted to our stockholders for approval, as well as our management and affairs. For example, these persons, if they choose to act together, would control or significantly influence the election of directors and approval of any merger, consolidation or sale of all or substantially all of our assets. This concentration of ownership control may:

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

The significant concentration of stock ownership may negatively impact the price of our common stock due to investors' perception that conflicts of interest may exist or arise.

Provisions in our amended and restated certificate of incorporation and amended and restated bylaws under Delaware law could make an acquisition of our company, which may be beneficial to our stockholders, more difficult and may prevent attempts by our stockholders to replace or remove our current management.

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

- a classified board of directors with three-year staggered terms, which may delay the ability of stockholders to change the membership of a majority of our board of directors;

- no cumulative voting in the election of directors, which limits the ability of minority stockholders to elect director candidates;
- the exclusive right of our board of directors to elect a director to fill a vacancy created by the expansion of the board of directors or the resignation, death or removal of a director, which prevents stockholders from filling vacancies on our board of directors;
- the ability of our board of directors to authorize the issuance of shares of preferred stock and to determine the terms of those shares, including preferences and voting rights, without stockholder approval, which could be used to significantly dilute the ownership of a hostile acquirer;
- the ability of our board of directors to alter our amended and restated bylaws without obtaining stockholder approval;
- the required approval of the holders of at least two-thirds of the shares entitled to vote at an election of directors to adopt, amend or repeal our amended and restated bylaws or repeal the provisions of our amended and restated certificate of incorporation regarding the election and removal of directors;
- a prohibition on stockholder action by written consent, which forces stockholder action to be taken at an annual or special meeting of our stockholders;
- the requirement that a special meeting of stockholders may be called only by the chief executive officer, the chairman, the president or the board of directors, which may delay the ability of our stockholders to force consideration of a proposal or to take action, including the removal of directors;
- advance notice procedures that stockholders must comply with in order to nominate candidates to our board of directors or to propose matters to be acted upon at a stockholders' meeting, which may discourage or deter a potential acquirer from conducting a solicitation of proxies to elect the acquirer's own slate of directors or otherwise attempting to obtain control of us; and
- the requirement that the Court of Chancery of the State of Delaware be the sole and exclusive forum for derivative actions and other corporate claims unless we consent to an alternative forum in writing, which may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or any of our directors, officers or other employees and discourage lawsuits with respect to such claims.

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

We have broad discretion in the use of our financial resources, including our cash and cash equivalents, and may not use them effectively.

Our management has broad discretion in the application of our financial resources, including our cash and cash equivalents, and could spend our cash in ways that do not improve our results of operations or enhance the value of our common stock. Our future use of our financial resources may differ substantially from our current plans. The failure by our management to apply our financial resources effectively could result in financial losses that could have a material adverse effect on our business and cause the price of our common stock to decline. Pending their use, we may invest our cash and cash equivalents in a manner that does not produce income or that loses value.

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

If our existing stockholders sell, or indicate an intent to sell, substantial amounts of our common stock that are eligible for sale in the public market, in some cases subject to compliance with the requirements of Rule 144 and after expiration of lock-up agreements entered into in connection with the January 2018 Offering, the trading price of our common stock could decline significantly. As of January 10, 2018, we had approximately 26.0 million shares of common stock outstanding and exercisable warrants to purchase approximately 10.0 million shares of common

stock outstanding. Approximately 4.2 million shares are subject to lock-up restrictions, which restrictions expire beginning on April 5, 2018. Also, on October 2, 2017, we filed a registration statement on Form S-3, which the SEC declared effective on October 10, 2017, which registered for resale 2,623,485 shares of our common stock (or approximately 10% of our total outstanding shares of common stock as of January 10, 2018) held by Malin Life Sciences Holdings Limited, or Malin. Malin is among the stockholders subject to the lock-up restrictions. Certain other of our stockholders hold substantial amounts of our common stock. If substantial amounts of 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.

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

We are an "emerging growth company," as defined in the JOBS Act, and may remain an emerging growth company until the earliest of (i) the end of the fiscal year in which the market value of our common stock that is held by non-affiliates exceeds $700.0 million as of the end of the second fiscal quarter, (ii) the end of the fiscal year in which we have total annual gross revenue of $1.07 billion or more during such fiscal year, (iii) the date on which we issue more than $1.0 billion in non-convertible debt in a three-year period or (iv) December 31, 2021, the end of the fiscal year following the fifth anniversary of the completion of our IPO. For so long as we remain an emerging growth company, we are permitted and intend to rely on exemptions from certain disclosure requirements that are applicable to other public companies that are not emerging growth companies. These exemptions include:

- not being required to comply with the auditor attestation requirements in the assessment of our internal control over financial reporting;
- not being required to comply with any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation or a supplement to the auditor's report providing additional information about the audit and the financial statements;
- reduced disclosure obligations regarding executive compensation; and
- exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved.

We have taken advantage of reduced reporting requirements in this Annual Report on Form 10-K. In particular, we do not intend to provide all of the executive compensation related information that would be required if we were not an emerging growth company. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may be reduced or more volatile. In addition, the JOBS Act provides that an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards. This allows an emerging growth company to delay the adoption of these accounting standards until they would otherwise apply to private companies. We have irrevocably elected not to avail ourselves of this exemption and, therefore, we will be subject to the same new or revised accounting standards and the accompanying demands on time and resources as other public companies that are not emerging growth companies face.

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

As a public company, and particularly after we are no longer an emerging growth company, we have and will continue to incur significant legal, accounting and other expenses. The Sarbanes-Oxley Act, the Dodd-Frank Wall Street Reform and Consumer Protection Act, the listing requirements of The Nasdaq Global Market and other applicable securities rules and regulations impose various requirements on public companies, including establishment and maintenance of effective disclosure and financial controls and corporate governance practices. Our management and other personnel devote a substantial amount of time to these compliance initiatives. Moreover, these rules and regulations have and will continue to require substantial legal and financial compliance costs and make some activities more time-consuming and costly. For example, these rules and regulations make it more difficult and more expensive for us to obtain director and officer liability insurance, which in turn could make it more difficult for us to attract and retain qualified members of our board of directors.

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

Our management team has limited experience managing a public company.

Some members of our management team have limited experience managing a publicly traded company, interacting with public company investors and complying with the increasingly complex laws pertaining to public companies. Our management team may not successfully or efficiently manage our existence as a public company subject to significant regulatory oversight and reporting obligations under the federal securities laws and the continuous scrutiny of securities analysts and investors. These obligations and constituents require significant attention from our senior management and could divert their attention away from the day-to-day management of our business.

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

The trading market for our common stock is influenced by the research and reports that industry or securities analysts publish about us or our business. If any of the analysts who cover us issue an adverse or misleading opinion regarding us, our business model, our intellectual property or our stock performance, or if our regulatory clearance timelines, clinical trial results or operating results fail to meet the expectations of analysts, our stock price would likely decline. If one or more of these analysts ceases coverage of us or fail to publish reports on us regularly, we could lose visibility in the financial markets, which in turn could cause our stock price or trading volume to decline.

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

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

If we fail to maintain proper and effective internal controls, our ability to produce accurate financial statements on a timely basis could be impaired which could adversely impact the market price of our stock.

We are subject to the reporting requirements of the Exchange Act, the Sarbanes-Oxley Act and the rules and regulations of the stock market on which our common stock is listed. The Sarbanes-Oxley Act requires, among other things, that we maintain effective disclosure controls and procedures and internal control over financial reporting. We must perform system and process evaluations and testing of our internal control over financial reporting to allow management to report on the effectiveness of our internal control over financial reporting in our Form 10-K filing for that year, as required by Section 404 of the Sarbanes-Oxley Act. This requires that we incur substantial additional professional fees and internal costs to expand our accounting and finance functions and that we expend significant management efforts.

From time to time, we may identify weaknesses in our system of internal financial and accounting controls and procedures that could result in a material misstatement of our financial statements. Our internal control over financial reporting will not prevent or detect all errors and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control system's objectives will be met. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud will be detected.

If we are unable to maintain proper and effective internal controls, we may not be able to produce timely and accurate financial statements. If that were to happen, the market price of our stock could decline and we could be

subject to sanctions or investigations by the stock exchange on which our common stock is listed, the SEC or other regulatory authorities.

Item 1B. Unresolved Staff Comments.

Not applicable.

Item 2. Properties.

We currently operate out of our corporate headquarters is in Morrisville, North Carolina, where we lease an existing 51,350 square foot facility under a lease with an initial term expiring in 2026. This facility was designed and upfit specifically for our nitric oxide research and development activities. We have an option to extend the lease agreement by five years upon completion of the initial lease term. We use our facility for primary research, development, and drug compound and product manufacturing activities, as well as general and administrative purposes, to support our nitric oxide technology and drug development programs.

In the future, we plan to evaluate the potential for transferring the manufacture of our drug product candidates to contract manufacturing organizations for development and commercial production or may establish a second facility for active pharmaceutical ingredient production manufacturing. We believe that our existing facilities are suitable and adequate for our current and near-term needs.

Item 3. Legal Proceedings.

We are subject to putative stockholder class action lawsuits that were filed in November 2017 in the United States District Court for the Middle District of North Carolina against us and certain of our current and former directors and officers. The lawsuits were filed on behalf of a putative class of all persons who purchased or otherwise acquired our securities (1) pursuant or traceable to our IPO, or (2) on the open market during the period specified in the complaints. The lawsuits assert claims for violation of Sections 11 and 15 of the Securities Act of 1933 and Sections 10(b) and 20(a) of the Exchange Act and SEC Rule 10b-5 promulgated thereunder, in connection with statements related to our Phase 3 clinical trials of SB204. The complaints seek, among other things, an unspecified amount of compensatory damages and attorneys' fees and costs on behalf of the putative class. We believe that the claims lack merit and intend to defend the lawsuits vigorously. However, there can be no assurance that a favorable resolution will be obtained in such lawsuits, and the actual costs may be significant.

Other than as described above, we are not currently a party to any material legal proceedings and are not aware of any claims or actions pending or threatened against us that we believe could have a material adverse effect on our business, operating results, cash flows or financial statements. In the future, we may from time to time become involved in litigation relating to claims arising from our ordinary course of business.

Item 4. Mine Safety Disclosures.

Not applicable.

PART II

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

Market Information

Our common stock has traded on the Nasdaq Global Market under the symbol "NOVN" since September 21, 2016. Prior to that time, there was no public market for our common stock. As a result, we have only set forth quarterly information with respect to the high and low sales prices of our common stock since September 21, 2016. The following table states the high and low sales prices of our common stock as reported on the Nasdaq Global Market for the periods indicated.

	Low	High
Fiscal Year Ended December 31, 2017		
First Quarter	$ 3.52	$ 27.77
Second Quarter	$ 3.67	$ 7.85
Third Quarter	$ 3.80	$ 7.33
Fourth Quarter	$ 4.14	$ 6.69
Fiscal Year Ended December 31, 2016		
Third Quarter (beginning September 21, 2016)	$ 13.77	$ 23.79
Fourth Quarter	$ 17.50	$ 30.90

The last price of our common stock as reported on the Nasdaq Global Market on March 26, 2018 was $3.09 per share.

Holders

As of March 22, 2018, there were approximately 177 stockholders of record of our common stock. Holders of record are defined as those stockholders whose shares are registered in their names in our stock records and do not include beneficial owners of common stock whose shares are held in the names of brokers, dealers or clearing agencies.

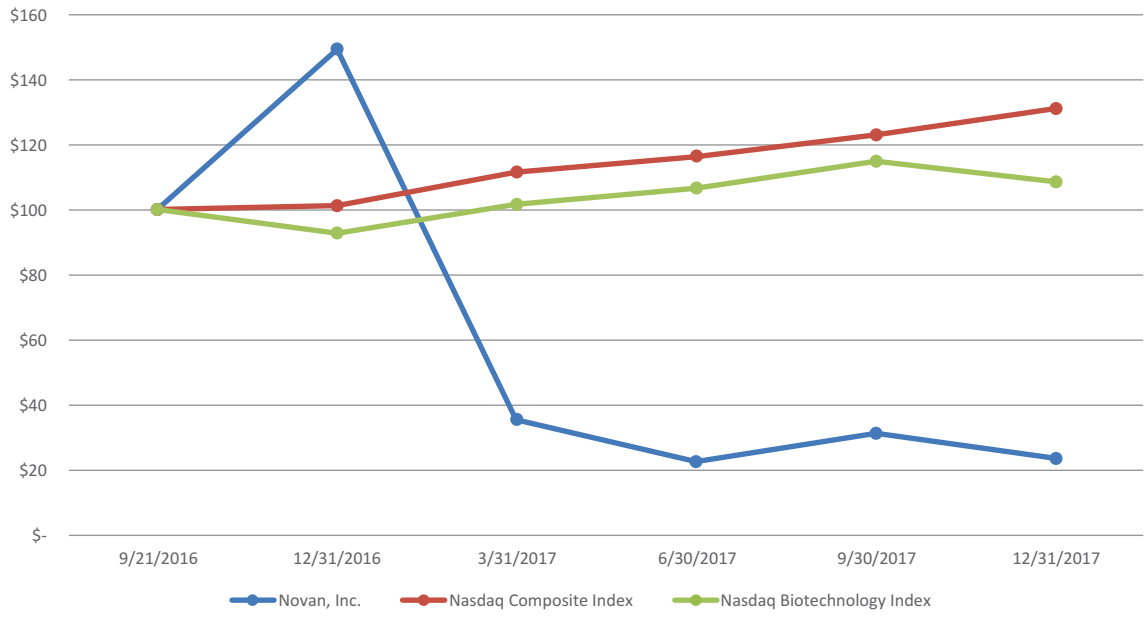
Dividends

We have never paid cash dividends and do not anticipate paying cash dividends in the foreseeable future.

Stock Performance Graph

This performance graph is not "soliciting material," is not deemed filed with the SEC and is not to be incorporated by reference in any filing by us under the Securities Act or the Exchange Act, whether made before or after the date hereof and irrespective of any general incorporation language in any such filing. The stock price performance shown on the graph is not necessarily indicative of future price performance.

Comparison of Cumulative Total Return
Among Novan, Inc., the Nasdaq Composite Index and the Nasdaq Biotechnology Index



The above graph measures the change in a $100 investment in our common stock from September 21, 2016 (the date our common stock commenced trading on the Nasdaq Global Market) through December 31, 2017. Our relative performance is then compared with the Nasdaq Composite Index (COMPX) and the Nasdaq Biotechnology Index (NBI).

Recent Sales of Unregistered Securities

None.

Use of Proceeds from IPO

On September 20, 2016, the SEC declared our Registration Statement on Form S-1 (File No. 333-213276) effective for our IPO, which closed on September 26, 2016, pursuant to which we sold an aggregate of 4,715,000 shares of our common stock, including the underwriters option to purchase 615,000 additional shares, at a price to the public of $11.00 per share for aggregate gross proceeds of $51.9 million. As a result, we received net proceeds of $44.6 million (after underwriters' discounts, commissions, and reimbursements totaling $4.1 million and additional offering related costs of $3.2 million). The managing underwriter of the offering was Piper Jaffray & Co.

During the period from the IPO through December 31, 2017, we used the proceeds in accordance with the planned use of proceeds as described in our final prospectus dated September 20, 2016 and filed with the SEC on September 22, 2016.

Purchases of Equity Securities by the Issuer and Affiliated Purchasers

We did not purchase any of our equity securities during the fourth quarter of 2017.

Item 6. Selected Financial Data.

SELECTED CONSOLIDATED FINANCIAL DATA

You should read the following selected consolidated financial data together with the information under the caption "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our audited financial statements and the accompanying notes included in this Annual Report on Form 10-K. The consolidated statement of operations data for the years ended December 31, 2017, 2016 and 2015 and the consolidated balance sheet data as of December 31, 2017 and 2016 are derived from the audited financial statements included elsewhere in this Annual Report. The selected consolidated balance sheet data as of December 31, 2015, is derived from audited financial statements that are not included in this Annual Report.

	Year Ended December 31,		
	2017	2016	2015
	(in thousands except share and per share data)		
License and collaboration revenue	$ 1,765	$ —	$ —
Research and development services revenue	375	—	—
Total revenue	2,140	—	—
Operating expenses:			
Research and development	25,212	46,489	16,569
General and administrative	13,113	13,337	9,265
Total operating expenses	38,325	59,826	25,834
Operating loss	(36,185)	(59,826)	(25,834)
Other (expense) income, net	(942)	127	48
Loss from continuing operations	(37,127)	(59,699)	(25,786)
Loss from discontinued operations	—	—	(2,274)
Net loss and comprehensive loss	$ (37,127)	$ (59,699)	$ (28,060)
Loss per share, basic and diluted:			
Continuing operations	$ (2.32)	$ (9.97)	$ (11.36)
Discontinued operations	—	—	(1.01)
Net loss per share, basic and diluted (1)	$ (2.32)	$ (9.97)	$ (12.37)
Weighted-average common shares used in computing net loss per share, basic and diluted (1)	15,981,247	5,985,985	2,269,124

(1) See "Note 1—Organization and Significant Accounting Policies" to our consolidated financial statements included elsewhere in this Annual Report for an explanation of the method used to calculate the historical basic and diluted net loss per share.

	As of December 31,		
	2017	2016	2015
	(in thousands)		
Balance sheet data:			
Cash and cash equivalents	$ 2,524	$ 34,611	$ 45,688
Total current assets	3,704	35,569	46,933
Total assets	21,134	52,473	49,816
Total current liabilities	8,418	13,377	5,095
Total liabilities	23,356	21,407	5,099
Convertible preferred stock	—	—	104,798
Accumulated deficit	(160,160)	(123,033)	(63,334)
Total stockholders' (deficit) equity	(2,222)	31,066	(60,081)

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

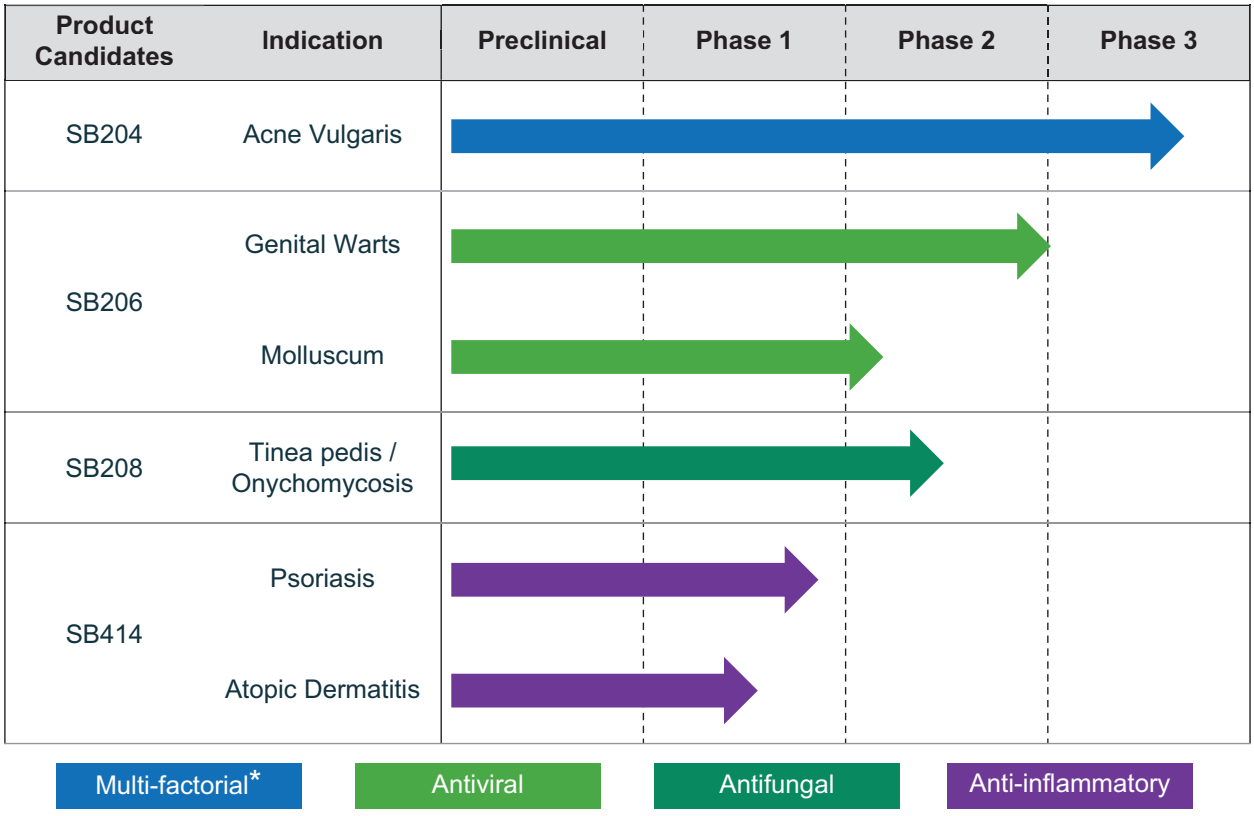
This Management's Discussion and Analysis of Financial Condition and Results of Operations should be read with our consolidated financial statements and notes thereto included elsewhere in this Annual Report on Form 10-K. In addition to historical information, the following discussion contains forward-looking statements that involve risks, uncertainties and assumptions. Where possible, we have tried to identify these forward-looking statements by using words such as "may," "will," "expect," "believe," "anticipate," "intend," "could," "should," "potential," "predict," "project," "estimate," or "continue" and similar expressions or variations. Our actual results could differ materially from those anticipated by the forward-looking statements due to important factors and risks including, but not limited to, those set forth in the "Risk Factors" in Part I, Item 1A of this report.

Overview

We are a clinical-stage biotechnology company focused on leveraging nitric oxide's natural antiviral and immunomodulatory mechanisms of action to treat dermatological and oncovirus-mediated diseases. Nitric oxide plays a vital role in the natural immune system response against microbial pathogens and is a critical regulator of inflammation. Our ability to harness nitric oxide and its multiple mechanisms of action has enabled us to create a platform with the potential to generate differentiated product candidates. The two key components of our nitric oxide platform are our proprietary Nitricil technology, which drives the creation of new chemical entities, or NCEs, and our topical formulation science, both of which we use to tune our product candidates for specific indications for specific diseases. Our ability to deploy nitric oxide in a solid form, on demand and in localized formulations allows us the potential to improve patient outcomes in a variety of diseases.

We are advancing strategic development programs in the fields of dermatology and oncovirus-mediated diseases. We have clinical-stage dermatology drug candidates with anti-acne (SB204) and antifungal (SB208) applications, which we intend to advance through partnerships, collaborations or other strategic relationships that we are currently exploring. We are utilizing our existing capital resources to fund the ongoing and near-term development activities in our antiviral (SB206) and anti-inflammatory (SB414) programs, as described in further detail below. Advancement of the SB206 and SB414 development programs beyond ongoing and near-term activities is dependent upon our ability to access additional capital from non-dilutive sources, including partnerships, collaborations, licensing, grants or other strategic relationships, or through equity or debt financings.

Our clinical-stage product candidate pipeline is currently positioned described in the table below:



* Includes anti-inflammatory and antibacterial activity – *P. acnes* in the case of SB204 for the treatment of acne.

Product Candidate Development Outlook

- ***SB204 is a once-daily, topical monotherapy for the treatment of acne vulgaris.*** In the first quarter of 2017, we reported top-line results from two identically designed Phase 3 pivotal clinical trials for SB204. SB204 demonstrated statistical significance compared to vehicle on all three co-primary endpoints in one of the trials but demonstrated statistical significance on only one of three co-primary endpoints in the other trial. We conducted an in-depth examination of the full data sets from these trials, including post hoc analyses in pooled and sub populations, with extensive assistance from third-party expert consultants in biostatistics and regulatory affairs.

  In mid-2017, we also completed our 40-week long term safety trial in eligible patients with acne who had previously completed 12 weeks of treatment in the related Phase 3 pivotal trials of SB204. No significant adverse events were observed with over 400 patients followed for six months and over 200 patients followed for one year.

  The information generated from the Phase 3 pivotal trials, the post hoc analyses and examinations as well as the long term safety trial is fundamental to the advancement of the SB204 program through regulatory interactions and potential collaborative relationships described below.

  - *January 2017*—We entered into a license agreement, and a related amendment, with Sato, or the Sato Agreement, whereby we licensed rights to develop, use, and sell SB204 in certain topical dosage forms in Japan for the treatment of acne vulgaris. The significant terms and the related accounting considerations of the Sato Agreement are further described in the "Licensing and Collaboration Arrangements" section below and in "Note 4—Collaboration Arrangements" to the accompanying consolidated financial statements included in this Annual Report on Form 10-K.

- *September 2017*—We held a productive guidance meeting with the FDA and obtained clinical and regulatory guidance around the SB204 program relative to the previously completed parallel Phase 3 pivotal trials in patients with moderate and severe acne.
- *November 2017*—We executed a non-binding term sheet with a third party to create a business structure that would enable further development and advancement of the SB204 program with an additional Phase 3 clinical trial. The business structure envisioned in the non-binding term sheet would access third-party financing and third-party execution of the additional clinical trial.
- *First Quarter of 2018*—Novan and the third party continue to evaluate and work towards finalization of the most appropriate design of one or more clinical trial(s) to maximize the probability of success. As part of this process, we are also examining all aspects of the acne field, including recent Phase 3 clinical trial failures in this therapeutic area. The next step requires additional FDA input and guidance that we expect to obtain during a Type C meeting scheduled in the second quarter of 2018. We believe further FDA input from the upcoming meeting will facilitate (i) finalization of our Phase 3 strategy and (ii) conclusion and execution of a definitive agreement with the third party.

  As outlined in the details of the November 2017 non-binding term sheet, the exclusivity period between ourselves and the third party expired in early March 2018. We continue to collaborate with the third party on all aspects of the Phase 3 program design and are actively working towards finalization of the definitive agreement. We are targeting these activities to be substantially complete prior to the upcoming FDA meeting so that SB204 can be advanced after the FDA's feedback is fully incorporated into the final Phase 3 strategy. The finalized third-party business structure may differ from what was envisioned in the non-binding term sheet due to the fluidity of the regulatory feedback, the continued assessment of the optimal strategy as well as the challenging set of co-primary efficacy endpoints. As a result, the business structure may include a blend of capital providers, including corporate and institutional investors. In addition, we may retain an option to participate in some portion of the funding. Both Novan and the third party continue to evaluate the optimal path forward for the asset and believe that feedback from the upcoming FDA meeting will help to provide clarity around that path.

  We intend to continue to evaluate various risk/benefit scenarios as we determine how to deploy capital for development in the acne space. We remain highly focused on managing the dynamic process of balancing the upside optionality and the near-term risk that accompanies the anticipated business structure. We target substantially completing a strategic arrangement, consistent with the expected timing for completion of our Phase 3 program design, so that the remaining components of the Phase 3 program could commence during the third quarter of 2018 if the parties agree that the risk/benefit assessment is appropriate to move forward.

- ***SB206 is a first-in-class, topical antiviral gel*** that we are developing for the treatment of viral skin infections, with a current focus on genital and perianal warts caused by *human papillomavirus,* or HPV, and molluscum contagiosum, a contagious skin infection caused by the *molluscipoxvirus.*
  - *Molluscum Contagiosum* – In the fourth quarter of 2017, we submitted an investigational new drug application, or IND, for this indication and, in the first quarter of 2018, we initiated a Phase 2 clinical trial utilizing SB206 for the treatment of molluscum. Top line results from this Phase 2 trial are targeted in the fourth quarter of 2018. We will evaluate the results from this Phase 2 trial and consider our financial priorities before determining how best to progress with the development of SB206 in this indication.
  - *External Genital Warts* – In 2017, we advanced SB206 through the completion of a clinically successful Phase 2 dose-ranging trial in patients with external genital and perianal warts and held a positive end-of-Phase 2 meeting with the FDA. SB206 is currently positioned for Phase 3 pivotal trials in patients with external genital warts. We expect future advancement of SB206 in this indication to occur after the formation of a partnering relationship, which we are actively exploring, or another form of additional funding.

  In addition to the aforementioned current focus areas, we are also evaluating whether to conduct development activities for SB206 as a therapy for HPV-associated sexually transmitted infections, or STIs.

We may further consider selecting and performing pre-clinical development of an NCE for the treatment of high risk neoplasias, including cervical and anal neoplasias, caused by HPV-16 and HPV-18.

- ***SB208 is a broad-spectrum antifungal gel*** for the treatment of superficial cutaneous fungal infections of the skin and nails, such as tinea pedis and onychomycosis. We reported positive top-line results from a Phase 2 proof-of-concept trial in patients with clinical signs and symptoms of tinea pedis in the second quarter of 2017. We are currently exploring potential partnerships, collaborations or other strategic relationships to further advance SB208 in tinea pedis and onychomycosis indications.
- ***SB414 is a topical cream-based product candidate*** that we are developing for the treatment of inflammatory skin diseases, with a current focus on the treatment of psoriasis and atopic dermatitis (eczema). In 2017, we completed all necessary pre-clinical studies, submitted an IND to the FDA, and initiated two Phase 1b clinical trials in the field of immunology. We have fully enrolled and completed patient treatment in a Phase 1b clinical trial to evaluate SB414 cream for the treatment of psoriasis. We are targeting complete results, including biomarker data, in the second quarter of 2018. We have also initiated a Phase 1b trial with SB414 in adults with atopic dermatitis and top line results are targeted in the third quarter of 2018. We expect to evaluate the results from these two trials comprehensively during the second half of 2018 and will then determine the appropriate developmental next steps for SB414.

Corporate Updates—Organizational and Governance Structure Alignment with Current Strategy

Board of Directors

We added three new directors to our board during 2017 and early 2018 to increase scientific, development, and manufacturing expertise critical to the oversight of our drug development strategy. Our board also recently formed a science and technology committee, consisting of members of the board in consultation with the Company's Executive Management Team. This committee will assist the board in evolving and overseeing the strategic direction and medical applications of our proprietary nitric oxide-based technology.

- In February 2018, Eugene Sun was appointed to the board of directors as a non-employee director and chairperson of our science and technology committee.
- In September 2017, Machelle Sanders was appointed to the board of directors as a non-employee director and, in November 2017, was also appointed to our compensation committee.
- In August 2017, Paula Brown Stafford, our Chief Development Officer, was appointed to the board of directors.

Executive Management Team

During 2017 and early 2018 we repositioned our organizational structure to align with the aforementioned drug development strategy. In addition to the changes described below, we expect certain targeted repositioning activities will continue during 2018 in alignment with our strategy.

- In June 2017, G. Kelly Martin, one of our directors, assumed the role of our Chief Executive Officer on an interim basis. At the same time, Nathan Stasko, formerly President and Chief Executive Officer, began his new role of President and Chief Scientific Officer.
- Following the departure of Richard Peterson, our former Chief Financial Officer, William L. Hodges was appointed as our Chief Financial Officer and principal financial and accounting officer on an interim basis in March 2017. Mr. Hodges served throughout the remainder of 2017 and then stepped down following the completion of our public offering in January 2018. Jeff N. Hunter, our Chief Business Officer, was appointed to fill the role of Interim Chief Financial Officer and principal financial and accounting officer upon Mr. Hodges stepping down. We are planning to hire a permanent Chief Financial Officer in the first half of 2018.
- We expanded other portions of our executive and senior management team, including the appointment of Paula Brown Stafford as Chief Development Officer, the promotion of Jeff N. Hunter to Executive Vice

President and Chief Business Officer and the appointment of Tomoko Maeda-Chubachi, M.D., Ph.D. as Vice President of Medical Dermatology.

- In May 2017, M. Joyce Rico, M.D., our former Chief Medical Officer, departed the Company, and in January 2018, Brian Johnson, our former Chief Commercial Officer, departed the Company.

Corporate Updates—Other

Shelf Registration Filing

On October 2, 2017, we filed a shelf registration statement on Form S-3 with the SEC, which the SEC declared effective on October 10, 2017, or the Shelf Registration. The Shelf Registration contained a prospectus which covers:

(i) the offering, issuance and sale by us of up to a maximum aggregate offering price of $150 million of our common stock, preferred stock, debt securities, warrants, and units, including those that may be issued upon conversion of, in exchange for or upon exercise of any such securities; and

(ii) the offering, issuance and sale of up to 2,623,485 shares of our common stock held by Malin Life Sciences Holdings Limited, or Malin, our largest stockholder at December 31, 2017. These common stock shares represent Malin's total shareholding in Novan as of October 2, 2017. Malin requested that we register all of the shares it held to facilitate its ability to utilize the shares as collateral. At the time we filed the Shelf Registration, Malin represented to our board of directors that it had no present intention to sell its shares or monetize its shareholding but reserves its right to manage its balance sheet and equity positions going forward. Malin confirmed it remained supportive of the management team and board of Novan, the potential application of the underlying technology platform in broad dermatological indications and the value proposition of the Company.

January 2018 Offering

On January 9, 2018, we completed a public offering of our common stock and warrants, or the January 2018 Offering, under a prospectus supplement to our effective Shelf Registration. We sold an aggregate of 10,000,000 shares of common stock and warrants to purchase up to 10,000,000 shares of our common stock at a public offering price of $3.80 per share of common stock and accompanying warrant. The warrant exercise price is $4.66 per share and will expire four years from the date of issuance. Net proceeds from the offering were approximately $35.2 million after deducting underwriting discounts and commissions and estimated offering expenses of approximately $2.8 million.

2016 Incentive Award Plan Amendment

In June 2017, our stockholders approved an amendment to our 2016 Incentive Award Plan, or the 2016 Plan, to increase the number of shares that may be issued under the 2016 Plan by 1,200,000 shares.

Amendments to Sublicenses with KNOW Bio

In October 2017, we completed a transaction with KNOW Bio, LLC, or KNOW Bio, granting us exclusive worldwide rights for certain oncovirus applications of nitric oxide-based products. An oncovirus is a virus that causes cancer, including the neoplasias and carcinomas caused by high-risk HPV. The intellectual property rights also allow for potential future translations of nitric oxide as a treatment for rare and orphan diseases caused by other double stranded DNA viruses including Kaposi's sarcoma-associated herpesvirus (HHV-8) and Merkel cell polyomavirus (MCV). The terms of this transaction are further described in "Note 4—Collaboration Arrangements" to the accompanying consolidated financial statements included in this Annual Report on Form 10-K. Our acquisition of these intellectual property rights to treat viral malignancies with nitric oxide enables the potential expansion of our product candidate pipeline in the field of virology using existing and new NCEs, as described in the "Overview—Product Candidate Development Outlook" section above.

Sato License Agreement

On January 12, 2017, we entered into a license agreement, and a related amendment, with Sato Pharmaceutical Co., Ltd., or Sato, relating to SB204, our drug candidate for the treatment of acne vulgaris in Japan, or the Sato Agreement. Pursuant to the Sato Agreement, as amended, we granted to Sato an exclusive, royalty-bearing, non-transferable right and license under certain of our intellectual property rights, with the right to sublicense with our prior written consent, to develop, use and sell products in Japan that incorporate SB204 in certain topical dosage forms for the treatment of acne vulgaris, and to make the finished form of such products. The rights granted to Sato do not include the right to manufacture the active pharmaceutical ingredient, or API, of SB204; rather the parties agreed to negotiate a commercial supply agreement pursuant to which we or a third party contract manufacturer would be the exclusive supplier to Sato of API for the commercial manufacture of licensed products in the licensed territory. We will also supply finished product for use in development of SB204 in the licensed territory. Under the terms of the Sato Agreement, we also have exclusive rights to certain intellectual property that may be developed by Sato in the future, which we may choose to use for our own development and commercialization of SB204 outside of Japan.

In exchange for the licenses and rights granted to Sato under the Sato Agreement, Sato agreed to pay us a $10.8 million non-refundable upfront payment, as well as additional milestone payments upon achievement of various future development, regulatory and commercial milestones. Sato must also pay us a royalty equal to a mid-single digit percentage of net sales of licensed products in the licensed territory, subject to a reduction in the royalty payments under specified circumstances.

The Sato Agreement's significant terms and the related accounting considerations are further described in the "Components of our Results from Operations" section below and in "Note 4—Collaboration Arrangements" to the accompanying consolidated financial statements included in this Annual Report on Form 10-K.

Financial Overview

Since our inception in 2006, we have devoted substantially all of our efforts to developing our nitric oxide platform technology and resulting product candidates, including conducting preclinical and clinical trials and providing general and administrative support for these operations. We conduct these activities in a single operating segment. We have not generated any revenue from product sales and, to date, have funded our operations through a variety of sources described in further detail within the "Liquidity and Capital Resources" section below. From inception through December 31, 2017, we have raised total equity and debt proceeds of $148.7 million to fund our operations. We have incurred net losses in each year since inception and, as of December 31, 2017, we had an accumulated deficit of $160.2 million. We incurred net losses of $37.1 million, $59.7 million and $28.1 million in the years ended December 31, 2017, 2016 and 2015, respectively. We expect to continue to incur substantial losses in the future as we conduct our planned operating activities. We do not expect to generate revenue from product sales unless and until we obtain regulatory approval from the FDA for our clinical-stage product candidates. If we obtain regulatory approval for any of our product candidates, there will be significant commercialization expenses related to product sales, marketing, manufacturing and distribution.

In addition, we expect that we will continue to incur substantial expenses as we continue clinical trials and preclinical studies for, and research and development of, our product candidates and maintain, expand and protect our intellectual property portfolio. As a result, in addition to the proceeds that we recently received from our January 2018 Offering, we will need substantial additional funding to support our planned and future operating activities. Adequate future funding may not be available to us on acceptable terms, or at all. The current market value of our common stock may negatively impact funding options and the acceptability of funding terms. Additionally, we expect future advancement of certain of our product candidates to occur after the formation of partnering relationships. Our failure to obtain sufficient additional funds on acceptable terms as and when needed, or our failure to enter into partnering relationships for our product candidates, could cause us to alter or reduce our planned operating activities, including but not limited to delaying or discontinuing planned product candidate development activities, to conserve our cash and cash equivalents. Such actions could delay development timelines and have a material adverse effect on our business, results of operations and financial condition and market valuation. As further discussed in our audited financial statements and related footnotes included in this Annual Report on Form 10-K, these matters raise substantial doubt about our ability to continue as a going concern.

Components of our Results of Operations

Revenue

Licensing and collaboration revenue consists of the amortization of a non-refundable $10.8 million upfront payment received under the Sato Agreement. The material terms of the Sato Agreement and related revenue recognition are described above and within "Note 4—Collaboration Arrangements" to our consolidated financial statements included in this Annual Report on Form 10-K. The $10.8 million upfront consideration under this agreement is being recognized on a straight-line basis over the estimated performance period, which is currently March 2017 through the first quarter of 2022.

Research and development services revenue is associated with the master development services and clinical supply agreement and related statements of work we entered into with KNOW Bio, or collectively the KNOW Bio Services Agreement. Under the KNOW Bio Services Agreement, we are providing certain development and manufacturing services to KNOW Bio in exchange for service fees. Although existing services have contractual budget estimates totaling approximately $0.9 million, the service fees are billed on a cost-plus basis based on actual time and materials incurred by us. We recognized approximately $0.4 million of services revenue during the year ended December 31, 2017. In January 2018, upon request by KNOW Bio, we stopped performing remaining development or manufacturing services contemplated under the Services Agreement and we cannot currently estimate if or when we may perform further services for KNOW Bio under existing or future statements of work. We do not expect the fees we may receive under the KNOW Bio Services Agreement, if any, to significantly increase the period over which our cash and cash equivalents can fund our operating expenses. Our accounting policies pertaining to KNOW Bio are included in "Note 1—Organization and Significant Accounting Policies" to the accompanying consolidated financial statements included in this Annual Report on Form 10-K.

See "Note 1—Organization and Significant Accounting Policies" to our audited consolidated financial statements included elsewhere in this Annual Report on Form 10-K for details regarding the new revenue recognition standard, which became effective January 1, 2018.

Research and Development Expenses

Since our inception, we have focused our resources on our research and development activities, including conducting preclinical studies and clinical trials, manufacturing development efforts and activities related to regulatory filings for our product candidates. Research and development expenses, including those paid to third parties for which there is no alternative use, are expensed as they are incurred. Research and development expenses include:

- external research and development expenses incurred under agreements with contract research organizations, or CROs, investigative sites and consultants to conduct our clinical trials and preclinical and non-clinical studies;
- costs to acquire, develop and manufacture supplies for clinical trials and preclinical studies, including fees paid to contract manufacturing organizations, or CMOs;
- legal and other professional fees related to compliance with FDA requirements;
- licensing fees and milestone payments incurred under license agreements;
- salaries and related costs, including stock-based compensation and travel expenses, for personnel in our research and development functions; and
- facilities, depreciation and other allocated expenses, which include direct and allocated expenses for rent, maintenance of facilities, utilities, equipment and other supplies.

From inception through December 31, 2017, we have incurred approximately $113.9 million in research and development expenses to develop, expand or otherwise improve our nitric oxide platform and resulting product candidates, as well as costs incurred to generate research and development services revenue. The table below sets forth our external research and development expenses incurred for current product candidates and unallocated internal research and development expenses for the years ended December 31, 2017, 2016 and 2015. All research

and development salaries and related personnel costs, as well as certain manufacturing costs, facilities expenses and costs incurred to generate research and development services revenue, are included in unallocated internal research and development expenses.

	Year Ended December 31,		
	2017	2016	2015
		(in thousands)	
External:			
SB204	$ 7,000	$ 33,158	$ 8,569
SB206	527	2,362	2,141
SB208	386	1,594	—
SB414	2,757	602	—
Other programs	254	241	975
Unallocated internal research and development expenses	14,288	8,532	4,884
Total research and development expenses	$ 25,212	$ 46,489	$ 16,569

We expect that for the foreseeable future, the substantial majority of our research and development efforts will be focused on our clinical programs and our future pipeline development. Major clinical and preclinical development activities conducted during the year ended December 31, 2017 are summarized as follows:

- For SB204, we completed parallel pivotal Phase 3 trials early in 2017, followed by completion of a 40-week long term safety trial in eligible patients with acne who had previously completed 12 weeks of treatment in the related Phase 3 pivotal trials of SB204 in the third quarter of 2017.
- For SB206, we completed a Phase 2 clinical trial for the treatment of external genital warts and announced top-line results in the fourth quarter of 2016. We also submitted an IND in the fourth quarter of 2017 for the treatment of molluscum contagiosum and began start-up activities for the ongoing Phase 2 clinical trial in patients with molluscum.
- For SB208, we initiated a Phase 2 clinical development program in July 2016 and announced positive top-line results in April 2017.
- For SB414, we completed our preclinical studies and submitted an IND to the FDA during the third quarter of 2017 and initiated our two currently ongoing Phase 1b clinical trials.

We expect to incur substantial research and development expenses in the future as we develop our clinical product candidates and for other existing or future product candidates. In particular, we expect to continue to incur substantial external development service provider fees and other research and development costs in 2018 for ongoing activities summarized in the development plan in the "Overview—Development Activities and Outlook" section above. Although we expect to incur substantial external research and development expenses in 2018 for the aforementioned activities, we expect these expenses will be lower than external research and development expenses incurred in 2017. Further, the future advancement of the SB204 and SB208 product candidates are subject to our ability to identify partnerships, collaborations or other strategic relationships currently being explored. We may decide to revise our plans or the related timing, depending on information we learn through our research and development activities and depending on our ability to access additional capital and our financial priorities.

The successful development of our product candidates is highly uncertain. At this time, we cannot reasonably estimate the timing or costs required to complete the remaining development of our current product candidates or any future product candidates. This is due to the numerous risks and uncertainties associated with the development of product candidates. See the section entitled "Risk Factors" in this Annual Report on Form 10-K for a discussion of the risks and uncertainties associated with our research and development projects.

General and Administrative Expenses

Our general and administrative expenses consist primarily of salaries and related costs, including stock-based compensation and travel expenses for personnel in our executive, finance, commercial, corporate development and other administrative functions. Other general and administrative expenses include allocated depreciation and

facility-related costs, legal costs of pursuing patent protection of our intellectual property, insurance coverage and professional services fees for auditing, tax, general legal, litigation defense and other corporate and administrative services.

We expect to continue to incur substantial general and administrative expenses in 2018 in support of our product development operating activities and as necessary to operate in a public company environment. Significant general and administrative expenses associated with operations in a public company environment include legal, accounting, regulatory and tax-related services associated with maintaining compliance with exchange listing and SEC requirements, directors' and officers' liability insurance premiums and investor relations activities. In addition, we expect litigation defense fees to increase during 2018 as we vigorously defend the putative stockholder class action lawsuits as described in the section entitled "Legal Proceedings" of this Annual Report on Form 10-K.

Other Income, net

Other income, net consists primarily of (i) lease interest expense on our primary facility lease financing obligation, (ii) interest income earned on cash and cash equivalents and (iii) other miscellaneous expenses. We expect to continue to incur interest expense on our primary facility lease financing obligation during 2018 and through the remainder of the initial lease term that expires in 2026.

Results of Operations

Comparison of the Years Ended December 31, 2017 and 2016

The following table sets forth our results of operations for the periods indicated:

	Year Ended December 31,			
	2017	2016	$ Change	% Change
	(in thousands, except percentages)			
License and collaboration revenue	$ 1,765	$ —	$ 1,765	100%
Research and development services revenue	375	—	375	100%
Total revenue	2,140	—	2,140	100%
Operating expenses:				
Research and development	25,212	46,489	(21,277)	(46)%
General and administrative	13,113	13,337	(224)	(2)%
Total operating expenses	38,325	59,826	(21,501)	(36)%
Operating loss	(36,185)	(59,826)	23,641	(40)%
Other (expense) income, net	(942)	127	(1,069)	(842)%
Net loss and comprehensive loss	$ (37,127)	$ (59,699)	$ 22,572	(38)%

Revenue

License and collaboration revenue of $1.8 million for the year ended December 31, 2017 is related to the amortization of a non-refundable upfront payment received under the Sato Agreement, which was executed in 2017. Research and development services revenue of $0.4 million for the year ended December 31, 2017 is associated with the development services performed under the KNOW Bio Services Agreement. We had no revenues during the year ended December 31, 2016.

Research and development expenses

Research and development expenses were $25.2 million for the year ended December 31, 2017, compared to $46.5 million for the year ended December 31, 2016. The decrease of $21.3 million was primarily due to the completion of certain clinical trials in our active development programs, including the two parallel Phase 3 pivotal trials and the long-term safety trial in the SB204 program, which resulted in a decrease of $26.2 million, the Phase 2 clinical trial for SB206, which resulted in a decrease of $1.9 million and the Phase 2 clinical trial for SB208, which resulted in a decrease of $1.2 million. These program costs were partially offset by a $2.2 million increase in SB414 development

program costs as we (i) completed preclinical studies in preparation for the IND that we submitted in the third quarter of 2017 and (ii) conducted clinical start-up activities and initiated two Phase 1b trials in patients with psoriasis and atopic dermatitis.

We also had an increase of $5.8 million in unallocated internal research and development expenses due to a $3.2 million increase in research and development personnel costs, of which $1.3 million represents non-cash stock compensation expense, and a $2.6 million increase in facility and manufacturing costs. The $3.2 million increase in personnel costs includes $0.6 million in cash severance costs associated with a workforce reduction and the departure of certain officers and employees, which was incurred in the second quarter of 2017, and a related $0.2 million increase in non-cash stock compensation expense associated with the accelerated vesting of option awards. The remaining increase in personnel costs includes an increase in stock compensation expense of $1.1 million associated with awards recently granted to our research and development personnel and $1.3 million associated with the targeted expansion of our organizational structure in support of our current development strategy. The $2.6 million increase in facility and manufacturing costs is primarily due to a full year of operations in our current office, laboratory and manufacturing facility in Morrisville, North Carolina, which we began to occupy in October 2016.

General and administrative expenses

General and administrative expenses were $13.1 million for the year ended December 31, 2017, compared to $13.3 million during the year ended December 31, 2016. The decrease of approximately $0.2 million was primarily due to decreases of $1.9 million in market research and related costs, a $0.1 million in personnel costs and $0.4 million in general corporate costs. These decreases were partially offset by an increase of $2.2 million in professional services, insurance, board compensation and other administrative costs necessary to support our operations as a public company. The $0.1 million net decrease in personnel costs included certain cost increases and decreases that ultimately resulted in a net decrease. For example, in 2017, we incurred discrete severance costs related to a workforce reduction and the departure of our former Chief Financial Officer that resulted in a total increase of $0.8 million, including $0.5 million of cash severance costs and $0.3 million in related non-cash stock compensation expense associated with the accelerated vesting of option awards. Other personnel cost increases included a $0.9 million of non-cash stock compensation expense associated with awards granted in 2017 and $0.2 million of travel-related costs. These increases were offset by a $1.7 million decrease in salaries, benefits and accrued bonus compensation costs following the aforementioned resource realignment events that occurred in 2017.

Other (expense) income, net

Other (expense) income, net was ($0.9) million expense for the year ended December 31, 2017, compared to $0.1 million income for the year ended December 31, 2016. The net expense increase of approximately $1.1 million was primarily due to the recognition of approximately $1.0 million of interest expense on our primary facility lease financing obligation beginning in the first quarter of 2017, following the completion of the facility's build-out phase in December 2016.

Comparison of the Years Ended December 31, 2016 and 2015

The following table sets forth our results of operations for the periods indicated:

	Year Ended December 31,			
	2016	2015	$ Change	% Change
	(in thousands, except percentages)			
Operating expenses:				
Research and development	$ 46,489	$ 16,569	$ 29,920	181%
General and administrative	13,337	9,265	4,072	44%
Total operating expenses	59,826	25,834	33,992	132%
Operating loss	(59,826)	(25,834)	(33,992)	132%
Other income, net	127	48	79	*
Loss from continuing operations	(59,699)	(25,786)	(33,913)	132%
Loss from discontinued operations	—	(2,274)	2,274	*
Net loss	$ (59,699)	$ (28,060)	$ (31,639)	113%

** Not Meaningful*

Research and development expenses

Research and development expenses were $46.5 million for the year ended December 31, 2016, compared to $16.6 million for the year ended December 31, 2015. The increase of $29.9 million was primarily due to increases in our active development programs, including $24.6 million in the SB204 program, $0.2 million in the SB206 program, $1.4 million in the SB208 program and $0.1 million in the SB414 program preclinical development activities. We also had an increase of $3.6 million in unallocated internal research and development expenses. The increases during the year ended December 31, 2016 were primarily associated with the commencement and conduct of our Phase 3 clinical trials for SB204, the continued conduct and completion of our Phase 2 clinical trial for SB206, the commencement and conduct of our Phase 2 clinical program for SB208 and continued preclinical research and development for SB414. The increase in our other unallocated internal research and development expenses was primarily the result of increased personnel and related costs that support and administer our active development programs.

General and administrative expenses

General and administrative expenses were $13.3 million for the year ended December 31, 2016, compared to $9.3 million during the year ended December 31, 2015. The increase of approximately $4.1 million was primarily due to a $1.0 million increase in personnel and related costs to support the growth of our research and development activities and to perform various other administrative functions, a $2.1 million increase in market research and related costs and a $1.0 million increase in professional services, insurance, board compensation and other administrative costs necessary to support our operations as a public company.

Liquidity and Capital Resources

Since our inception through December 31, 2017, we have financed our operations primarily with $148.7 million in net proceeds from the issuance and sale of equity securities and convertible debt securities, including $44.6 million in net proceeds from the sale of common stock in our 2016 initial public offering. Other historical forms of funding have included payments received from licensing and supply arrangements and government research contracts and grants. We received an upfront payment of approximately $10.8 million following the execution of the Sato Agreement in the first quarter of 2017 for the exclusive right to develop, use and sell SB204 in certain topical dosage forms in Japan for the treatment of acne vulgaris.

As of December 31, 2017, we had $2.5 million of cash and cash equivalents and negative working capital of ($4.7) million. We believe that cash on hand as of December 31, 2017, when combined with the net proceeds from our January 2018 Offering will provide us with adequate liquidity to fund our operating needs into the second quarter of 2019. However, as described in the section below entitled "Capital Requirements," we anticipate that we will need

substantial additional funding to continue our operating activities and make further advancements in each of our drug development programs.

Our cash and cash equivalents are held in a variety of interest-bearing instruments, including money market accounts. Cash in excess of immediate requirements is invested with a view toward liquidity and capital preservation, and we seek to minimize the potential effects of concentration and degrees of risk.

On January 9, 2018, we completed a public offering of our common stock and warrants under a prospectus supplement to our effective shelf registration statement on Form S-3. We sold an aggregate of 10,000,000 shares of common stock and warrants to purchase up to 10,000,000 shares of our common stock at a public offering price of $3.80 per share of common stock and accompanying warrant. The warrant exercise price is $4.66 per share and will expire four years from the date of issuance. Net proceeds from the offering were approximately $35.2 million after deducting underwriting discounts and commissions and estimated offering expenses of approximately $2.8 million.

Facility Lease Financing

Our 51,000 square foot leased facility in Morrisville, North Carolina serves as our corporate headquarters and primary research, development and manufacturing facility. We have accounted for the lease for this facility as a capitalized asset and a corresponding facility financing obligation on our balance sheets. We began recognizing interest expense associated with this financing obligation in the first quarter of 2017, following completion of the build-out phase in December 2016. See "Note 1—Organization and Significant Accounting Policies" and "Note 6—Commitments and Contingencies" to the consolidated financial statements included in this Annual Report on Form 10-K for further discussion of the accounting for this lease.

Cash Flows

The following table sets forth our cash flows for the periods indicated:

	Year Ended December 31,		
	2017	2016	2015
		(in thousands)	
Net cash provided by (used in):			
Continuing operating activities	$ (29,857)	$ (48,911)	$ (20,765)
Continuing investing activities	(2,142)	(6,218)	(1,751)
Continuing financing activities	(88)	44,309	62,351
Net decrease in cash and cash equivalents – discontinued operations	—	(257)	(1,566)
Net increase (decrease) in cash and cash equivalents	$ (32,087)	$ (11,077)	$ 38,269

Net Cash Used in Continuing Operating Activities

During the year ended December 31, 2017, net cash used in operating activities was $29.9 million and consisted primarily of a net loss of $37.1 million, with adjustments for non-cash amounts related primarily to depreciation expense of $1.4 million, stock-based compensation expense of $3.8 million and a favorable change in assets and liabilities of $2.0 million. The favorable net change in assets and liabilities was primarily due to receipt of an upfront payment of $10.8 million following execution of the Sato Agreement. This increase was partially offset by decreases in accounts payable and accrued expense balances associated with our outside research and development activities during the period, including a $4.3 million decrease in accrued outside research and development services. The decrease in payables and accruals for these services was primarily related to the completion of the Phase 3 pivotal trials and long-term safety trial in our SB204 program and the Phase 2 clinical trial in our SB206 program. In addition, we had approximately $0.2 million in accrued severance costs as of December 31, 2017, which we expect to settle through cash disbursements during the first half of 2018.

During the year ended December 31, 2016, net cash used in operating activities was $48.9 million and consisted primarily of a net loss of $59.7 million, with adjustments for non-cash amounts related primarily to depreciation

expense of $0.8 million, stock-based compensation expense of $1.6 million, and a $8.5 million favorable change in assets and liabilities. The favorable net change in assets and liabilities was primarily due to increases in accounts payable and accrued expense balances associated with our outside research and development activities during the period, including a $1.4 million increase in accounts payable and a $4.6 million increase in accrued outside research and development services. The increase in accounts payable and accruals for these services was primarily related to (i) our increased development program activities in 2016, including the commencement and conduct of our SB204 Phase 3 clinical trials, SB206 Phase 2 clinical trial, and SB208 Phase 2 clinical program; and (ii) the timing of the invoicing and payment for such services.

During the year ended December 31, 2015, net cash used in operating activities was $20.8 million and consisted primarily of a net loss of $28.1 million, which was the result of cash used in our research and development activities, with adjustments for loss from discontinued operations of $2.3 million, non-cash amounts related primarily to depreciation expense of $0.6 million, stock-based compensation expense of $2.0 million, a $0.6 million increase in prepaid expenses related to CRO pre-funding payments and a $3.0 million increase in accrued liabilities, primarily related to higher research and development accruals.

Net Cash Used in Continuing Investing Activities

During the year ended December 31, 2017, net cash used in investing activities was $2.1 million, which primarily related to purchases of laboratory equipment and leasehold improvements at our facility in Morrisville, North Carolina.

During the year ended December 31, 2016, net cash used in investing activities was $6.2 million, which related to purchases of property and equipment of $6.1 million and the purchase of intangible assets of $0.1 million. The purchases of property and equipment in 2016 were primarily associated with laboratory equipment and our portion of the facility build out costs at our new headquarters and manufacturing facility in Morrisville, North Carolina.

During the year ended December 31, 2015, net cash used in investing activities was $1.8 million. Net cash used in investing activities during the year ended December 31, 2015 represented purchases of property and equipment of $1.3 million and $0.5 million restricted to secure a letter of credit.

Net Cash Provided by Continuing Financing Activities

During the year ended December 31, 2017, net cash used in financing activities was $0.1 million, consisting primarily of deferred offering costs of $0.2 million, which were partially offset by proceeds from the exercise of stock options of $0.1 million.

During the year ended December 31, 2016, net cash provided by financing activities was $44.3 million, consisting primarily of $44.6 million in net proceeds from our IPO, offset by a repurchase of common stock, which is now held as treasury stock, of approximately $0.2 million and payments on facility lease obligations of approximately $0.2 million.

During the year ended December 31, 2015, net cash provided by financing activities was $62.4 million, consisting of $67.1 million from proceeds from the issuance of preferred stock and $0.5 million from the issuance of common stock in connection with the exercise of stock options, offset in part by the $5.2 million of cash distributed as part of the Separation Transaction.

Capital Requirements

To date, we have not generated any revenue from product sales. We do not know when, or if, we will generate any revenue from product sales. We do not expect to generate revenue from product sales unless and until we obtain regulatory approval of and commercialize one of our current or future product candidates. We anticipate that we will continue to generate losses for the foreseeable future, and we expect the losses to increase as we continue the development of, and seek regulatory approvals for, our product candidates and begin to commercialize any approved products. We are subject to all of the risks incident in the development of new pharmaceutical products, and we may

encounter unforeseen expenses, difficulties, complications, delays and other unknown factors that may adversely affect our business.

Our primary use of cash is to fund our operating expenses, which consist principally of research and development expenditures necessary to advance our clinical-stage product candidates. Based upon our current operating plan, we anticipate that our existing cash and cash equivalents as of December 31, 2017, together with the $35.2 million in net proceeds from the January 2018 Offering, are sufficient to fund our operations into the second quarter of 2019. We are utilizing our existing capital resources to fund the ongoing and near-term development activities in our core programs, as described in the "Overview" section above. In addition to the net proceeds received from the January 2018 Offering, we anticipate that we will need substantial additional funding to continue our operating activities and make further advancements in each of our drug development programs, as summarized in the "Overview" section above. Further advancement of these development programs is dependent upon our ability to access additional capital through non-dilutive sources, including partnerships, collaborations, licensing, grants or other strategic relationships, or through the issuance of debt or equity securities. We may decide to revise our activities or their timing depending on the availability of additional funding, partnership opportunities and our financial priorities. There can be no assurance that we will be able to obtain additional capital on terms acceptable to us, on a timely basis or at all. A failure to obtain sufficient funds on acceptable terms when needed could cause us to alter or reduce our planned operating activities, including but not limited to delaying planned product candidate development activities, to conserve our cash and cash equivalents. Our anticipated expenditure levels may change if we make adjustments to our current operating plan. As of December 31, 2017, we had an accumulated deficit of $160.2 million and there is substantial doubt about our ability to continue as a going concern if we do not secure adequate additional financing.

We have based our projections of operating capital requirements on assumptions that may prove to be incorrect and we may use all of our available capital resources sooner than we expect. Because of the numerous risks and uncertainties associated with research, development and commercialization of pharmaceutical products, we are unable to estimate the exact amount of our operating capital requirements. Our future funding requirements will depend on many factors, including, but not limited to:

- the initiation, progress, timing, costs, results, and evaluation of results of trials for our clinical-stage product candidates, including trials conducted by us or potential future partners;
- the progress, timing, costs and results of development and preclinical study activities relating to other potential applications of our nitric oxide platform;
- the number and characteristics of product candidates that we pursue;
- our ability to enter into strategic relationships for the continued development of certain product candidates and the success of those arrangements;
- our success in scaling our manufacturing process;
- the outcome, timing and costs of seeking regulatory approvals;
- the occurrence and timing of potential development and regulatory milestones achieved by Sato, our licensee for SB204 in Japan;
- the terms and timing of any future collaborations, licensing, consulting or other arrangements that we may enter into;
- the amount and timing of any payments we may be required to make, or that we may receive, in connection with the licensing, filing, prosecution, defense and enforcement of any patents or other intellectual property rights;
- the costs of preparing, filing and prosecuting patent applications, maintaining and protecting our intellectual property rights;
- defending against intellectual property related claims;
- the costs associated with our securities litigation, and the outcome of that litigation;

- the extent to which we in-license or acquire other products and technologies; and
- subject to receipt of marketing approval, revenue received from commercial sales or out licensing of our product candidates.

We also expect to incur capital expenditures as we continue to invest in information technology systems and equipment at our corporate headquarters and manufacturing facility in Morrisville, North Carolina.

Contractual Obligations and Contingent Liabilities

Facility financing lease

We entered into a lease agreement in August 2015 for a facility totaling approximately 51,000 square feet in Morrisville, North Carolina and began to occupy and utilize the facility in October 2016. The term of the lease commenced April 1, 2016 and terminates June 2026. The remaining estimated lease payments for this facility over the term of the lease are approximately $10.8 million. Monthly rental payments will be allocated between principal and interest expense associated with the facility financing obligation, as well as grounds rent expense of $8 per month.

We have accounted for this lease as a capitalized asset and a corresponding facility financing obligation on our balance sheets. See "Note 1—Organization and Significant Accounting Policies" and "Note 6—Commitments and Contingencies" to the accompanying consolidated financial statements included in this Annual Report on Form 10-K for further discussion of the accounting for this lease.

Sato Agreement

Pursuant to the Sato Agreement, we are obligated to supply Sato with all quantities of licensed products required by Sato for their development activities in Japan. As part of the Sato Agreement, as amended, we and Sato also agreed to negotiate a commercial supply agreement pursuant to which we or a third party contract manufacturer would be the exclusive supplier to Sato of the API of licensed products for the commercial manufacture of licensed products in the licensed territory. Additionally, we have agreed to perform certain oversight, review and supporting activities for Sato, including: (i) using commercially reasonable efforts to obtain marketing approval of SB204 in the U.S, (ii) sharing all future scientific information we may obtain during the term of the Sato Agreement pertaining to SB204, (iii) performing certain additional pre-clinical studies if such studies are deemed necessary by the Japanese regulatory authority, up to and not to exceed a total cost of $1.0 million, and (iv) participating in a joint committee that oversees, reviews, and approves Sato's development and commercialization activities under the Sato Agreement. Additionally, we have granted Sato the option to use our trademarks in connection with the commercialization of licensed products in the licensed territory for no additional consideration, subject to our approval of such use. We cannot estimate if, when or in what amounts such payments will become due under the Sato Agreement.

The intellectual property rights granted to Sato under the Sato Agreement include certain intellectual property rights which we have licensed from UNC. Under our license agreement with UNC, we are obligated to pay UNC a running royalty percentage in the low single digits on net sales of licensed products, including net sales that may be generated by Sato. Additionally, we made a payment to UNC in February 2017 representing the portion of the Sato upfront payment that was estimated to be directly attributable to the UNC intellectual property rights included in the license to Sato.

We also entered into an agreement with a third party to assist us in exploring the SB204 licensing opportunity that led to the execution of the Sato Agreement. We paid a fee of $0.2 million to the third party upon execution of the Sato Agreement and are obligated to pay the third party a low-single-digit percentage of any future milestone payments we may receive from the Sato Agreement.

Amendments to Sublicense Agreements with KNOW Bio

Pursuant to the terms of the amendments to the KNOW Bio Agreements that we entered into in October 2017, we re-acquired from KNOW Bio exclusive, worldwide rights under certain U.S. and foreign patents and patent applications controlled by us as of the execution date of the KNOW Bio Agreements, and patents and patent applications which may become controlled by us during the three years immediately following the execution date of the KNOW Bio Agreements, directed towards nitric oxide-releasing compositions and methods of manufacturing thereof, including methods of manufacturing Nitricil compounds, and other nitric oxide-based therapeutics, to develop and commercialize products for all diagnostic, therapeutic, prophylactic and palliative uses for any disease, condition or disorder caused by certain oncoviruses, or the Oncovirus Field. KNOW Bio also granted to us an exclusive license, with the right to sublicense, under any patents and patent applications which may become controlled by KNOW Bio during the three years immediately following the execution date of the KNOW Bio Agreements and directed towards nitric oxide-releasing compositions and methods of manufacturing thereof, including methods of manufacturing Nitricil compounds, and other nitric oxide-based therapeutics, but not towards medical devices, to develop and commercialize products for use in the Oncovirus Field. Additionally, KNOW Bio agreed that KNOW Bio will not commercialize any products in the Oncovirus Field during the first three years following the execution date of the KNOW Bio Agreements.

In addition to the $0.3 million non-refundable upfront payment we made upon execution of the KNOW Bio Amendments, we are obligated to make the following contingent payments in exchange for the rights granted to us in the Oncovirus Field:

(i) For products that incorporate a certain nitric oxide-releasing composition specified in the KNOW Bio Amendments and (i) are covered by KNOW Bio patents or (ii) materially use or incorporate know-how of KNOW Bio or us related to such composition that is created during the three years immediately following the execution date of the KNOW Bio Agreements, or the Covered Products, we must make the following payments to KNOW Bio:

- A milestone payment upon the first time each Covered Product is approved by the FDA for marketing in the Oncovirus Field;
- A royalty in the low single digits on net sales of Covered Products in the Oncovirus Field until the later of the expiration of the KNOW Bio patents covering the applicable Covered Product or the expiration of regulatory exclusivity on the applicable Covered Product; and
- In the event we sublicense the rights to a Covered Product to a third party in the Oncovirus Field, the Company must pay KNOW Bio a low double-digit percentage of any clinical development or NDA approval milestones we receive from the sublicensee for the Covered Product in the Oncovirus Field.

Nitricil is not the nitric oxide-releasing composition specified in the KNOW Bio Amendments as the subject of the foregoing payments. As such, products based on Nitricil are not subject to the foregoing milestone, royalty and sublicensing payment obligations.

The rights granted to us in the Oncovirus Field in the KNOW Bio Amendments continue for so long as there is a valid patent claim under the KNOW Bio Agreements, and upon expiration continue on a perpetual non-exclusive basis, and are subject to the termination rights of KNOW Bio and us that are set forth in the KNOW Bio Agreements. In addition, under the KNOW Bio Amendments, KNOW Bio may terminate the rights granted to us in the Oncovirus Field if: (i) we do not file a first IND with the FDA for a product in the Oncovirus Field by October 2020; or (ii) we do not file a first NDA with the FDA by October 2025 for a product in the Oncovirus Field and does not otherwise have any active clinical programs related to the Oncovirus Field at such time.

We also obtained a three-year exclusive option to include within our rights described above in the Oncovirus Field, the development and commercialization of products for all diagnostic, therapeutic, prophylactic and palliative uses for any disease, condition or disorder caused by up to four other specified oncoviruses, or the Option Field. If we elect to exercise this option, we will pay an exercise fee for each oncovirus for which the option is exercised, and the additional rights will be included in the Oncovirus Field as a result of the option exercise will be subject to the same

payment obligations for Covered Products, conditions, and termination rights as described above for the Oncovirus Field.

Other

We enter into contracts in the normal course of business with clinical research organizations for clinical trials and clinical supply manufacturing and with vendors for preclinical research studies, research supplies and other services and products for operating purposes. These contracts generally provide for termination on notice, and therefore we believe that our non-cancelable obligations under these agreements are not material.

Off-Balance Sheet Arrangements

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

Net Operating Loss and Research and Development Tax Credit Carryforwards

As of December 31, 2017, we had federal and state net operating loss carryforwards of approximately of $140.5 million and $142.4 million, respectively. The net operating loss carryforwards begin to expire in 2028 and 2023 for federal and state tax purposes, respectively. We have research and development tax credits of approximately $5.7 million to offset future federal taxes. These credits begin to expire in 2028.

We record a valuation allowance to offset any net deferred tax assets if, based upon the available evidence, it is more likely than not that we will not recognize some or all of the deferred tax assets. We have had a history of net losses since inception, and, as a result, we have established a 100% valuation allowance of $39.3 million for our net deferred tax assets as of December 31, 2017. If circumstances change and we determine that we will be able to realize some or all of these net deferred tax assets in the future, we will record an adjustment to the valuation allowance.

The Tax Reform Act of 1986 contains provisions which limit the ability to utilize the net operating loss carryforwards in the case of certain events including significant changes in ownership interests. In accordance with Section 382 of the Code, a change in equity ownership of greater than 50% within a three-year period results in an annual limitation on our ability to utilize our NOL carryforwards created during the tax periods prior to the change in ownership. We have not determined whether ownership changes exceeding this threshold, including our IPO and the January 2018 offering, have occurred. If a change in equity ownership has occurred which exceeds the Section 382 threshold, a portion of our NOL carryforwards may be limited. If our net operating loss carryforwards are limited, and we have taxable income which exceeds the permissible yearly net operating loss carryforwards, we would incur a federal income tax liability even though net operating loss carryforwards would be available in future years.

Jumpstart Our Business Startups Act of 2012 (JOBS Act)

In April 2012, the JOBS Act was signed into law. The JOBS Act contains provisions that, among other things, reduce certain reporting requirements for an "emerging growth company." As an "emerging growth company," we are electing not to take advantage of the extended transition period afforded by the JOBS Act for the implementation of new or revised accounting standards, and, as a result, we will comply with new or revised accounting standards on the relevant dates on which adoption of such standards is required for non-emerging growth public companies. Section 107 of the JOBS Act provides that our decision not to take advantage of the extended transition period is irrevocable. We have chosen to rely on the other exemptions and reduced reporting requirements provided by the JOBS Act. Subject to certain conditions set forth in the JOBS Act, as an "emerging growth company" we are not required to, among other things, (i) provide an auditor's attestation report on our system of internal controls over financial reporting pursuant to Section 404 of the Sarbanes-Oxley Act, (ii) provide all of the compensation disclosure that may be required of non-emerging growth public companies under the Dodd-Frank Act, (iii) comply with any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation or a supplement to the auditor's report providing additional information about the

audit and the financial statements (auditor discussion and analysis) and (iv) disclose certain executive compensation-related items, such as the correlation between executive compensation and performance and comparisons of the chief executive officer's compensation to median employee compensation. We may remain an emerging growth company until the last day of 2021. However, if certain events occur prior to such date, including if we become a "large accelerated filer," our annual gross revenue equals or exceeds $1.07 billion or we issue more than $1.0 billion of non-convertible debt in any three-year period, we will cease to be an emerging growth company prior to such date.

Recent Accounting Pronouncements

Recently issued accounting pronouncements that we have adopted or are currently evaluating are described in detail within "Note 1—Organization and Significant Accounting Policies" to the accompanying consolidated financial statements included in this Annual Report on Form 10-K.

Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

There were no changes in or disagreements with accountants on accounting and financial disclosures.

Critical Accounting Policies and Use of Estimates

Our management's discussion and analysis of financial condition and results of operations is based on our financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States, or GAAP. The preparation of these financial statements requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements, as well as the reported revenue and expenses during the reporting periods. These items are monitored and analyzed by us for changes in facts and circumstances, and material changes in these estimates could occur in the future. 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. Changes in estimates are reflected in reported results for the period in which they become known. Actual results may differ materially from these estimates under different assumptions or conditions.

While our significant accounting policies are more fully described in the notes to our financial statements included elsewhere in this annual report, we believe that the following accounting policies are critical to the process of making significant judgments and estimates in the preparation of our financial statements and understanding and evaluating our reported financial results.

Revenue Recognition

Beginning in 2017, we began to generate revenue from (i) providing research and development services and (ii) non-refundable upfront fees, milestone payments and royalties earned under license agreements.

Research and Development Services

Pursuant to U.S. GAAP that is effective as of and during the year ended December 31, 2017, our research and development services revenue is currently recognized when all of the following criteria are met: (i) persuasive evidence that an arrangement exists; (ii) delivery of the products or services has occurred; (iii) the selling price is fixed or determinable; and (iv) collectability is reasonably assured. Our contract research and development services revenue is recognized in the period in which the services are performed.

Licensing Arrangements

We entered into a licensing arrangement with Sato in the first quarter of 2017 and may enter into additional licensing arrangements in the future, in exchange for non-refundable upfront payments and potential future milestone and royalty payments. Such arrangements include multiple elements, including the sale of licenses and the provision of services. Under U.S. GAAP effective as of and during the year ended December 31, 2017, for

arrangements that involve the delivery of more than one element, each product, service and/or right to use assets is evaluated to determine whether it qualifies as a separate unit of accounting. This determination is based on whether the deliverable has "stand-alone value" to the customer. The consideration that is fixed or determinable is then allocated to each separate unit of accounting based on the relative selling prices of each deliverable. The consideration allocated to each unit of accounting is recognized as the related goods and services are delivered, limited to the consideration that is not contingent upon future deliverables. When an arrangement is accounted for as a single unit of accounting, we determine the period over which the performance obligations will be performed and revenue recognized. Management exercises significant judgment in the determination of (i) whether a deliverable has stand-alone value, (ii) whether the deliverable is considered to be a separate unit of accounting and (iii) the estimation of the relative fair value of each deliverable in the arrangement.

We recognize a milestone payment when earned if it is substantive and we have no ongoing performance obligations related to the milestone. A milestone payment is considered substantive if it: (i) is commensurate with either our performance to achieve the milestone or the enhanced value of the delivered item as a result of a specific outcome from the performance to achieve the milestone; (ii) relates solely to past performance; and (iii) is reasonable relative to all of the deliverables and payment terms, including other potential milestone consideration, within the arrangement.

Amounts received prior to satisfying all revenue recognition criteria are recorded as deferred revenue in the accompanying balance sheets.

See "Note 1—Organization and Significant Accounting Policies" to our audited consolidated financial statements included elsewhere in this Annual Report on Form 10-K for details regarding the new revenue recognition standard, which is effective January 1, 2018.

Accrued Research and Development Expenses

As part of the process of preparing financial statements, we are required to estimate accrued expenses. This process involves reviewing open contracts and purchase orders, communicating with applicable vendor personnel to identify services that have been performed on our behalf and estimating the level of service performed and the associated cost incurred for the service when we have not yet been invoiced or otherwise notified of actual cost. The majority of our service providers invoice us monthly in arrears for services performed. We make estimates of our accrued expenses as of each balance sheet date in our financial statements based on facts and circumstances known to us. We periodically confirm the accuracy of our estimates with the service providers and make adjustments if necessary. Examples of estimated accrued expenses include fees incurred by CROs in connection with clinical trials, fees paid to investigative sites in connection with clinical trials, professional service fees and unpaid salaries, wages and benefits.

We accrue our expenses related to clinical trials based on our estimates of the services received and efforts expended pursuant to contracts with multiple research institutions and CROs that conduct and manage clinical trials on our behalf. The financial terms of these agreements are subject to negotiation, vary from contract to contract and may result in uneven payment flows. Payments under some of these contracts depend on factors such as the successful enrollment of patients and the completion of clinical trial milestones. 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 will adjust the accrual accordingly. If we do not identify costs that we have begun to incur or if we underestimate or overestimate the level of services performed or the costs of these services, our actual expenses could differ from our estimates. We do not anticipate the future settlement of existing accruals to differ materially from our estimates.

Stock-Based Compensation

Determination of the Fair Value of Stock-based Compensation Grants

We record the fair value of stock options, restricted stock awards and other stock-based compensation issued to employees and non-employees as of the grant date as stock-based compensation expense. We typically recognize compensation expense over the requisite service period, which is typically the vesting period. We recorded non-cash stock-based compensation expense from continuing operations for employee and nonemployee stock option grants of $3.8 million, $1.6 million and $2.0 million for the years ended December 31, 2017, 2016 and 2015, respectively.

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 assumptions, some of which are highly subjective, including (i) the fair value of our common stock on the date of grant (described in the section entitled "Determination of the Fair Value of Common Stock"), (ii) the expected volatility of our stock, (iii) the expected term of the award, (iv) the risk-free interest rate and (v) expected dividends. In applying these assumptions, we considered the following factors:

- Due to the 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. We also considered characteristics such as industry, stage of life cycle, financial leverage, enterprise value, risk profiles and position within the industry, along 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 of the calculated expected term of our stock-based awards. We will continue to apply this process until a sufficient amount of historical information regarding the volatility of our own stock price becomes available.
- We have estimated the expected term of our employee stock options using the "simplified" method, whereby, the expected life equals the average of the vesting term and the original contractual term of the option.
- The risk-free interest rate is based on the yields of U.S. Treasury securities with maturities similar to the expected term of granted stock-based awards.
- We have never declared or paid any cash dividends to common stockholders and do not presently plan to pay cash dividends in the foreseeable future. Consequently, we use an expected dividend yield of zero.

See "Note 8—Stock Option Plan" to the accompanying consolidated financial statements included in this Annual Report on Form 10-K for the weighted average assumptions used in the Black-Scholes option-pricing model for awards granted in the years ended December 31, 2017, 2016 and 2015.

We are also required to estimate forfeitures at the time of grant, and to revise those estimates in subsequent periods if actual forfeitures differ from estimates. We use historical data to estimate pre-vesting option forfeitures and record stock-based compensation expense only for those awards that are expected to vest. To the extent that actual forfeitures differ from our estimates, the difference is recorded as a cumulative adjustment in the period the estimates were revised. Stock-based compensation expense recognized in the financial statements is based on awards that are ultimately expected to vest.

Determination of the Fair Value of Common Stock

Post-IPO Stock Option Grants—For all grants of stock options made following the completion of our IPO, we have determined, and will determine in the future, fair value based on the closing price of our common stock on the Nasdaq Global Market on the date of determination. As a result, the fair value of our common stock no longer requires a highly complex and subjective estimation process.

Pre-IPO Stock Option Grants—Prior to our IPO in September 2016, we were a private company with no active public market for our common stock. There were significant assumptions and estimates required in determining the fair value of our common stock for purposes of valuing stock-based compensation grants occurring prior to our IPO. Due to the absence of an active market for our common stock prior to our IPO, the fair value of our common stock was determined in good faith by our board of directors, with the assistance and upon the recommendation of management, based on a number of objective and subjective factors consistent with the methodologies outlined in the American Institute of Certified Public Accountants Practice Aid, Valuation of Privately-Held-Company Equity Securities Issued as Compensation, referred to as the AICPA Practice Aid, including:

- contemporaneous valuations of our shares of common stock;
- the prices of each of our series of convertible preferred stock sold by us to outside investors in arm's length transactions, and the rights, preferences and privileges of each of these series of preferred stock relative to our common stock;
- our consolidated results of operations, financial position and the status of our research and development efforts;

- the composition of our management team and board of directors;
- the material risks related to our business;
- the market performance of publicly traded companies in the life sciences and biotechnology sectors;
- the likelihood of achieving a liquidity event for the holders of our shares of common stock, such as a sale of the company or an initial public offering, given prevailing market conditions;
- the lack of marketability of our common stock; and
- external market conditions affecting the life sciences and biotechnology industry sectors.

We utilized a combination of the "Last Money In" approach and "Market-Based," or "Comps," approach to estimate our enterprise value prior to our IPO in September 2016. The "Last Money In" approach considered our prior financing rounds, which can provide meaningful indications to determine our enterprise value. The Comps approach considered our enterprise value through an analysis of recent sales and offerings of comparable companies. We then used the option pricing method, or OPM, to estimate the fair value of common stock associated with each pre-IPO stock option grant. Key assumptions reflected in the OPM calculations included the anticipated timing of a potential liquidity event, the estimated volatility of our common stock, and the discount for lack of marketability of our common stock.

Pursuant to the non-employee director compensation policy in effect at the time of our IPO, each non-employee director who served on the Board as of the pricing date of our IPO was automatically granted an option on September 20, 2016 to purchase the number of shares of common stock that had an aggregate fair value of $100,000 on the pricing date at an exercise price of $11.00 per share.

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

We are exposed to market risks in the ordinary course of our business. Our primary exposure to market risk is currently limited to our cash and cash equivalents, all of which have maturities of less than three months. The primary objectives of our investment activities are the preservation of principal, maintenance of liquidity for the purpose of funding operations and maximizing total return. The related interest income sensitivity is affected by changes in the general level of short-term U.S. interest rates. We place our cash and cash equivalents with high-credit quality financial institutions. Our investment policy prohibits us from holding corporate bonds, auction rate securities, asset-backed securities, municipal obligations, structured investment vehicles, extendable commercial paper or collateralized debt/loan obligations.

As of December 31, 2017, we had cash and cash equivalents of $2.5 million. We believe that an immediate one percentage point increase in interest rates would not materially affect the fair value of these instruments. We do not believe that our cash and cash equivalents have significant risk of default or illiquidity and do not expect our operating results or cash flows to be affected significantly by a sudden change in market interest rates. While we believe our cash and cash equivalents do not contain excessive risk, we cannot provide absolute assurance that in the future our investments will not be subject to adverse changes in fair value. In addition, we maintain significant amounts of cash and cash equivalents at one or more financial institutions that are in excess of federally insured limits.

Following the execution of the Sato Agreement in January 2017, we have become exposed to some degree of foreign exchange risk as a result of entering into transactions denominated in a currency other than U.S. dollars, particularly in Japanese yen. All foreign transactions settle on the applicable spot exchange basis at the time such payments are made, and all monetary balances are translated to U.S. dollars using period-end exchange rate. A hypothetical 10% change in the exchange rate between the Japanese yen and the U.S. dollar during any of the periods presented would not have had a significant impact on our financial statements.

Item 8. Financial Statements and Supplementary Data.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of Novan, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Novan Inc. and its subsidiaries (the "Company") as of December 31, 2017 and 2016, and the related consolidated statements of operations and comprehensive loss, of convertible preferred stock and stockholders' equity (deficit) and of cash flows for each of the three years in the period ended December 31, 2017, including the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and 2016, and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2017 in conformity with accounting principles generally accepted in the United States of America.

Substantial Doubt About the Company's Ability to Continue as a Going Concern

The accompanying consolidated financial statements have been prepared assuming that the Company will continue as a going concern. As discussed in Note 1 to the consolidated financial statements, the Company has suffered recurring losses from operations, negative cash flow from operating activities, and has an accumulated deficit that raise substantial doubt about its ability to continue as a going concern. Management's plans in regard to these matters are also described in Note 1. The financial statements do not include any adjustments that might result from the outcome of this uncertainty.

Basis for Opinion

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

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

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

/s/ PricewaterhouseCoopers LLP
Raleigh, North Carolina
March 27, 2018

We have served as the Company's auditor since 2014.

NOVAN, INC.
Consolidated Balance Sheets
(in thousands, except share and per share amounts)

	Year Ended December 31,	
	2017	2016
ASSETS		
Current assets:		
Cash and cash equivalents	$ 2,524	$ 34,611
Deferred offering costs	297	—
Prepaid expenses and other current assets	883	958
Total current assets	3,704	35,569
Restricted cash	539	539
Intangible assets	75	75
Other assets	192	—
Property and equipment, net	16,624	16,290
Total assets	$ 21,134	$ 52,473
LIABILITIES AND STOCKHOLDERS' (DEFICIT) EQUITY		
Current liabilities:		
Accounts payable	$ 479	$ 3,130
Accrued compensation	2,168	2,305
Accrued outside research and development services	1,392	5,737
Accrued legal and professional fees	504	382
Other accrued expenses	1,700	1,813
Deferred revenue, current portion	2,164	—
Capital lease obligation, current portion	11	10
Total current liabilities	8,418	13,377
Deferred revenue, net of current portion	6,919	—
Capital lease obligation, net of current portion	21	32
Facility financing obligation	7,998	7,998
Total liabilities	23,356	21,407
Commitments and contingencies (Notes 3, 4 and 6)		
Stockholders' (deficit) equity:		
Preferred stock $0.0001 par value; 10,000,000 shares designated as of December 31, 2017 and 2016; 0 shares issued and outstanding as of December 31, 2017 and 2016	—	—
Common stock $0.0001 par value; 200,000,000 shares authorized as of December 31, 2017 and 2016; 16,014,908 and 15,949,492 shares issued as of December 31, 2017 and 2016; 16,005,408 and 15,939,992 shares outstanding as of December 31, 2017 and 2016	2	2
Additional paid-in-capital	158,091	154,252
Treasury stock at cost, 9,500 shares as of December 31, 2017 and 2016	(155)	(155)
Accumulated deficit	(160,160)	(123,033)
Total stockholders' (deficit) equity	(2,222)	31,066
Total liabilities and stockholders' (deficit) equity	$ 21,134	$ 52,473

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

NOVAN, INC.
Consolidated Statements of Operations and Comprehensive Loss
(in thousands, except share and per share amounts)

	Year Ended December 31,		
	2017	2016	2015
License and collaboration revenue	$ 1,765	$ —	$ —
Research and development services revenue	375	—	—
Total revenue	2,140	—	—
Operating expenses:			
Research and development	25,212	46,489	16,569
General and administrative	13,113	13,337	9,265
Total operating expenses	38,325	59,826	25,834
Operating loss	(36,185)	(59,826)	(25,834)
Other (expense) income, net	(942)	127	48
Loss from continuing operations	(37,127)	(59,699)	(25,786)
Loss from discontinued operations	—	—	(2,274)
Net loss and comprehensive loss	$ (37,127)	$ (59,699)	$ (28,060)
Loss per share, basic and diluted:			
Continuing operations	$ (2.32)	$ (9.97)	$ (11.36)
Discontinued operations	—	—	(1.01)
Net loss per share, basic and diluted	$ (2.32)	$ (9.97)	$ (12.37)
Weighted-average common shares outstanding, basic and diluted	15,981,247	5,985,985	2,269,124

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

NOVAN, INC.
Consolidated Statements of Convertible Preferred Stock and Stockholders' Equity (Deficit)
(in thousands, except share amounts)

	Convertible Preferred Stock												Common Stock				Additional			
	Mezzanine B		Mezzanine A		Series 4		Series 3		Series 2		Series 1		Voting		Non-voting		Paid in	Treasury	Accumulated	
	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Capital	Stock	Deficit	Total
Balance as of December 31, 2014	—	$ —	1,178,802	$ 16,161	1,833,333	$ 11,000	1,322,570	$ 7,538	1,226,242	$ 2,000	1,229,862	$ 1,000	2,044,815	$ —	191,052	$ —	$ 400	—	$ (29,949)	$ (29,549)
Share-based compensation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2,385	—	—	2,385
Exercise of stock options	—	—	—	—	—	—	—	—	—	—	—	—	191,023	—	—	—	468	—	—	468
Issuance of Mezzanine A preferred stock	—	—	2,498,820	34,259	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Issuance of Mezzanine B preferred stock	1,242,069	32,840	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Distribution of KNOW Bio, LLC	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	(5,325)	(5,325)
Net loss	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	(28,060)	(28,060)
Balance as of December 31, 2015	1,242,069	32,840	3,677,622	50,420	1,833,333	11,000	1,322,570	7,538	1,226,242	2,000	1,229,862	1,000	2,235,838	—	191,052	—	3,253	—	(63,334)	(60,081)
Share-based compensation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,573	—	—	1,573
Exercise of stock options	—	—	—	—	—	—	—	—	—	—	—	—	31,333	—	—	—	35	—	—	35
Repurchase of treasury stock	—	—	—	—	—	—	—	—	—	—	—	—	(9,500)	—	—	—	—	(155)	—	(155)
Automatic conversion to common stock	(1,242,069)	(32,840)	(3,677,622)	(50,420)	(1,833,333)	(11,000)	(1,322,570)	(7,538)	(1,226,242)	(2,000)	(1,229,862)	(1,000)	8,967,321	1	(191,052)	—	104,797	—	—	104,798
Common stock issued through initial public offering, net of underwriting discounts, commissions and offering costs (Note 1)	—	—	—	—	—	—	—	—	—	—	—	—	4,715,000	1	—	—	44,594	—	—	44,595
Net loss	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	(59,699)	(59,699)
Balance as of December 31, 2016	—	—	—	—	—	—	—	—	—	—	—	—	15,939,992	2	—	—	154,252	(155)	(123,033)	31,066
Share-based compensation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3,758	—	—	3,758
Exercise of stock options	—	—	—	—	—	—	—	—	—	—	—	—	65,416	—	—	—	81	—	—	81
Net loss	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	(37,127)	(37,127)
Balance as of December 31, 2017	—	$ —	—	$ —	—	$ —	—	$ —	—	$ —	—	$ —	16,005,408	$ 2	—	$ —	$ 158,091	$ (155)	$ (160,160)	$ (2,222)

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

NOVAN, INC.
Consolidated Statements of Cash Flows
(in thousands)

	Year Ended December 31,		
	2017	2016	2015
Cash flow from operating activities:			
Net loss	$ (37,127)	$ (59,699)	$ (28,060)
Income from discontinued operations	—	—	2,274
Adjustments to reconcile net loss to net cash used in operating activities:			
Depreciation and amortization	1,423	757	631
Share-based compensation	3,758	1,573	1,974
Loss (gain) on disposal of property and equipment	45	(36)	8
Changes in operating assets and liabilities:			
Prepaid expenses and other current assets	75	(22)	(604)
Accounts payable	(2,523)	1,372	825
Accrued compensation	(137)	1,258	769
Accrued outside research and development services	(4,345)	4,649	837
Accrued legal and professional fees	(3)	179	200
Accrued expenses	86	1,083	411
Deferred revenue	9,083	—	—
Other	(192)	(25)	(30)
Net cash used in continuing operating activities	(29,857)	(48,911)	(20,765)
Net cash used in discontinued operating activities	—	(257)	(1,427)
Net cash used in operating activities	(29,857)	(49,168)	(22,192)
Cash flow from investing activities:			
Purchases of property and equipment	(2,168)	(6,143)	(1,212)
Proceeds from the sale of property and equipment	26	—	—
Purchase of intangible asset	—	(75)	—
Cash restricted to secure letter of credit	—	—	(539)
Net cash used in continuing investing activities	(2,142)	(6,218)	(1,751)
Net cash used in discontinued investing activities	—	—	(139)
Net cash used in investing activities	(2,142)	(6,218)	(1,890)
Cash flow from financing activities:			
Proceeds from issuance of preferred stock	—	—	67,099
Proceeds from initial public offering, net of underwriting fees and commissions	—	47,785	—
Payments related to public offering costs	(159)	(3,190)	—
Proceeds from exercise of stock options	81	35	458
Purchase of treasury stock	—	(155)	—
Dividend Distribution	—	—	(5,200)
Payments on capital lease obligation	(10)	(7)	(6)
Payments on facility financing obligation	—	(159)	—
Net cash (used in) provided by financing activities	(88)	44,309	62,351
Net (decrease) increase in cash and cash equivalents	(32,087)	(11,077)	38,269
Cash and cash equivalents as of beginning of period	34,611	45,688	7,419
Cash and cash equivalents as of end of period	$ 2,524	$ 34,611	$ 45,688
Supplemental disclosure of cash flow information:			
Cash paid for interest	$ 1,011	$ 410	$ 1
Supplemental disclosure of non-cash investing and financing activities:			
Purchases of equipment with accounts payable and accrued expenses	$ 80	$ 420	$ 92
Distribution of KNOW Bio, LLC equipment	$ —	$ —	$ 125
Equipment acquired through capital lease	$ —	$ 39	$ —
Non-cash addition to construction in progress related to build-to-suit lease and facility financing obligation	$ —	$ 8,157	$ —
Non-cash addition to deferred offering costs	$ 138	$ —	$ 309
Conversion of convertible preferred stock and non-voting common stock to voting common stock	$ —	$ 104,798	$ —
Deferred offering costs reclassified to additional paid-in capital	$	$ 3,190	$ —

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

Note 1: Organization and Significant Accounting Policies

Business Description and Basis of Presentation

Novan, Inc. ("Novan" and together with its subsidiaries, the "Company"), is a North Carolina-based clinical-stage biotechnology company focused on leveraging nitric oxide's natural antiviral and immunomodulatory mechanisms of action to treat dermatological and oncovirus-mediated diseases. Novan was incorporated in January 2006 under the state laws of Delaware and its wholly owned subsidiary, Novan Therapeutics, LLC was organized in 2015 under the state laws of North Carolina.

The accompanying consolidated financial statements of the Company have been prepared in accordance with generally accepted accounting principles in the United States of America ("U.S. GAAP").

Basis of Consolidation

The accompanying consolidated financial statements reflect the operations of the Company and its wholly owned subsidiary. All intercompany accounts and transactions have been eliminated in consolidation.

On December 30, 2015, the Company completed the distribution of 100% of the outstanding member interests of KNOW Bio, LLC ("KNOW Bio"), a former wholly owned subsidiary of the Company, to Novan's stockholders (the "Distribution"), pursuant to which KNOW Bio became an independent privately held company. Beginning in the fourth quarter of 2015, KNOW Bio's financial results for periods prior to the Distribution were reflected in the Company's consolidated financial statements, retrospectively, as discontinued operations. During the year ended December 31, 2016, the Company made payments of accounts payable associated with the discontinued operations that were not assumed by KNOW Bio as part of the Distribution. These payments are classified as discontinued operating activities in the accompanying consolidated statement of cash flows for the year ended December 31, 2016.

The Company does not own an equity interest in KNOW Bio, but does have variable interests in KNOW Bio through the following contractual arrangements:

- At the time of the Distribution, the Company entered into exclusive sublicense agreements with KNOW Bio, which were amended in October 2017, as described in Note 4—Collaboration Arrangements. The Company's contingent obligation to pay future milestones or royalties to the University of North Carolina at Chapel Hill ("UNC") and other licensors, including in the event of KNOW Bio non-performance under the sublicense arrangements, creates a variable interest.
- The Company entered into a master development services and clinical supply agreement with KNOW Bio in April 2017 and related statements of work ("SOW") in the second quarter and second half of 2017 (collectively, the "KNOW Bio Services Agreement"). Under the KNOW Bio Services Agreement, the Company is providing certain development and manufacturing services to KNOW Bio's respiratory drug development subsidiary. Pursuant to applicable guidance in FASB ASC 810-10, *Consolidation,* a service provider arrangement such as the KNOW Bio Services Agreement is deemed a variable interest when a reporting entity has another previously existing variable interest in a legal entity, such as the Company's sublicense arrangements with KNOW Bio, as described above.

Through its portfolio of operating subsidiary companies, KNOW Bio is advancing work in nitric oxide-based therapies in fields where they have exclusive intellectual property rights. The Company determined that KNOW Bio was a variable interest entity for 2017 based on reassessments of variable interest entity characteristics, pursuant to FASB ASC 810-10, *Consolidation,* performed by the Company in 2017. These reassessments were required because certain triggering events occurred during 2017, including the execution of the KNOW Bio Services

Agreement and the series of related SOWs and the execution of the amendments to the exclusive sublicense agreements with KNOW Bio.

The Company concluded that it is not the primary beneficiary of KNOW Bio and, therefore, does not consolidate KNOW Bio in its consolidated financial statements herein. This conclusion is based on the fact that the Company has no significant power or decision-making authority over KNOW Bio's drug and medical device development activities, which are the activities most significantly impacting KNOW Bio's economic performance. Under the KNOW Bio Services Agreement, the Company is providing certain development and manufacturing services to KNOW Bio on commercial terms. In exchange for these services, KNOW Bio pays service fees for actual time and materials incurred by the Company on a cost-plus basis. The terms of the amendments to the exclusive sublicense agreements with KNOW Bio were evaluated by the Company, with the support of a third-party expert, and were determined to be at fair value and arms-length. As a result, the amendments did not create any ability for Novan to influence KNOW Bio's decision-making.

As of December 31, 2017, the Company has a deferred revenue balance of $35 related to services performed under the KNOW Bio Services Agreement. The Company has no exposure to loss as a result of its involvement with KNOW Bio. The Company's sublicense arrangement with KNOW Bio does expose the Company to potential future risk of loss, whereby the Company is obligated to pay contingent future milestones or royalties to UNC or other licensors, including in the event of KNOW Bio non-performance under the sublicense arrangement; however, if KNOW Bio failed to pay these obligations, KNOW Bio would be in breach of its agreements with the Company and intellectual property rights would revert back to the Company. See Note 3—Research and Development Agreements for detailed information regarding potential future milestone and royalty payments due to UNC and other licensors. The contractual terms of the KNOW Bio Services Agreement, including upfront payment requirements, cost-plus pricing and timely payment terms, mitigate the current or potential future risk of loss to the Company for services performed under the KNOW Bio Services Agreement.

Liquidity and Ability to Continue as a Going Concern

The Company's consolidated financial statements have been prepared assuming that the Company will continue as a going concern, which contemplates the realization of assets and the settlement of liabilities and commitments in the normal course of business. The accompanying consolidated financial statements do not include any adjustments to reflect the possible future effects on the recoverability and classification of assets or the amounts and classification of liabilities that may result from uncertainty related to the Company's ability to continue as a going concern.

The Company has evaluated principal conditions and events that may raise substantial doubt about its ability to continue as a going concern within one year from the date that these financial statements are issued. The Company identified the following conditions:

- The Company has reported a net loss in all fiscal periods since inception and, as of December 31, 2017, the Company had an accumulated deficit of $160,160.
- The Company's primary use of cash is to fund its operating expenses, which consist principally of research and development expenditures necessary to advance its product candidates. The Company has evaluated its expected, probable future cash flow needs and has determined that it expects to incur substantial losses in the future as it conducts planned operating activities. The Company expects that the amount of cash and cash equivalents on hand as of December 31, 2017, together with the proceeds from the public offering completed in January 2018 (see Note 13—Subsequent Events) will be sufficient to meet its anticipated cash requirements into the second quarter of 2019.

The Company has concluded that the prevailing conditions and ongoing liquidity risks faced by the Company raise substantial doubt about its ability to continue as a going concern. To mitigate these prevailing conditions and ongoing liquidity risks, the Company needs and intends to raise additional capital in the form of revenues, contributions, grants or other payments from collaborative or licensing partners or from equity or debt financings prior to the full development of the Company's product candidates. There can be no assurance that the Company will be able to obtain additional capital on terms acceptable to the Company, on a timely basis or at all. The failure of the Company to obtain sufficient funds on acceptable terms when needed could cause the Company to alter or

reduce its planned operating activities, including but not limited to delaying planned product candidate development activities, to conserve its cash and cash equivalents. Such actions could delay development timelines and have a material adverse effect on the Company's results of operations, financial condition and market valuation. Additionally, there is no assurance that the Company can achieve its development milestones or that its intellectual property rights will not be challenged.

Reverse stock-split and amendments to certificate of incorporation

On September 7, 2016, following approval by the Company's board of directors and the Company's stockholders, the Company amended its certificate of incorporation effecting a 1-for-1.2 reverse stock split of its voting and non-voting common stock and a proportional adjustment to the existing conversion ratio of each series of its convertible preferred stock. As a result of the reverse stock split, the Company also adjusted the share amounts under its employee incentive plan. All disclosure of common shares and per common share data in the accompanying financial statements and related notes have been adjusted to reflect the reverse stock split and adjustment of preferred stock conversion ratios for all periods presented.

The reverse stock split did not cause an adjustment to the par value or the authorized shares of the voting and non-voting common stock or the convertible preferred stock. However, subsequent to the reverse stock split and in conjunction with the closing of the Company's initial public offering, ("IPO"), the certificate was further amended to provide for an adjustment to the number of authorized shares to 210,000,000 shares of capital stock, of which 200,000,000 shares have been designated as $0.0001 par value common stock, and 10,000,000 shares have been designated as $0.0001 par value preferred stock.

Initial public offering

On September 26, 2016, the Company completed the IPO of its common stock. The Company sold an aggregate of 4,715,000 shares of common stock under the registration statement on Form S-1 declared effective by the Securities and Exchange Commission ("SEC") on September 20, 2016, at a public offering price of $11.00 per share for aggregate gross proceeds of $51,865. Net proceeds were $44,595, after deducting underwriting discounts and commissions of $4,080 and offering expenses of $3,190. Upon the completion of the IPO, all outstanding shares of the Company's non-voting common stock and convertible preferred stock were automatically converted into 8,967,321 shares of common stock. The shares issued as part of the IPO in September 2016 increased the number of shares outstanding, which impacts the comparability of the Company's reported net loss per share calculations between the 2017, 2016 and 2015 periods.

Shelf Registration Filing

On October 2, 2017, the Company filed a shelf registration statement on Form S-3 with the SEC, which the SEC declared effective on October 10, 2017. The registration statement contained a prospectus which covers:

- the offering, issuance and sale by the Company of up to a maximum aggregate offering price of $150,000 of the Company's common stock, preferred stock, debt securities, warrants, and units, including those that may be issued upon conversion of, in exchange for or upon exercise of any such securities; and
- the offering, issuance and sale of up to 2,623,485 shares of the Company's common stock held by Malin Life Sciences Holdings Limited ("Malin"), the Company's largest stockholder at December 31, 2017. These common stock shares represent Malin's total shareholding in the Company as of October 2, 2017. Malin requested that the Company register all of the shares it held to facilitate its ability to utilize the shares as collateral. At the time the Company filed the Shelf Registration, Malin represented to our board of directors that it had no present intention to sell its shares or monetize its shareholding but reserves its right to manage its balance sheet and equity positions going forward. Malin confirmed it remained supportive of the management team and board of Novan, the potential application of the underlying technology platform in broad dermatological indications and the value proposition of the Company.

The Company incurred costs directly related to (i) the shelf registration statement filing totaling $110 and (ii) the public offering completed in January 2018 (see Note 13—Subsequent Events) totaling $187, all of which were capitalized and included in deferred offering costs in the accompanying balance sheet as of December 31, 2017.

Reclassifications

Certain prior period amounts have been reclassified to conform to current period presentation. These changes had no effect on previously reported net loss, financial position or cash flows.

Use of Estimates

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities at the date of the financial statements and the reported amount of revenues and expenses during the reporting period. Actual results could differ from these estimates.

Cash and Cash Equivalents

The Company considers all highly liquid instruments purchased with a maturity of three months or less to be cash equivalents. Cash and cash equivalents include deposits and money market accounts.

Restricted Cash

The Company included in noncurrent assets restricted cash of $539 as of December 31, 2017 and 2016, which consisted of funds maintained in a separate deposit account to secure a letter of credit for the benefit of the lessor of facility space leased by the Company.

Concentration of Credit Risk

Financial instruments that potentially subject the Company to a concentration of credit risk consist principally of cash and cash equivalents. The Company places its cash and cash equivalents with financial institutions and these deposits may at times be in excess of insured limits.

Intangible Assets

Intangible assets represent the cost to obtain and register the Company's internet domain. Indefinite-lived intangible assets are not amortized and are assessed for impairment at least annually.

Property and Equipment

Property and equipment are recorded at cost and depreciated using the straight-line method over their estimated useful lives as follows:

Computer and office equipment	3 years
Furniture and fixtures	5-7 years
Laboratory equipment	7 years
Building asset under facility lease	25 years

Leasehold improvements are amortized over the shorter of the life of the lease or the useful life of the improvements. Expenditures for maintenance and repairs are expensed as incurred. Improvements and betterments that add new functionality or extend the useful life of an asset are capitalized.

Intellectual Property

The Company's policy is to file patent applications to protect technology, inventions and improvements that are considered important to its business. Patent positions, including those of the Company, are uncertain and involve complex legal and factual questions for which important legal principles are largely unresolved. Due to the uncertainty of future value to be realized from the expenses incurred in developing the Company's intellectual property, the cost of filing, prosecuting and maintaining internally developed patents are expensed as general and administrative costs as incurred.

Leases

The Company leases office space and certain equipment under non-cancelable lease agreements. The leases are reviewed for classification as operating or capital leases. For operating leases, rent is recognized on a straight-line basis over the lease period. For capital leases, the Company records the leased asset with a corresponding liability and amortizes the asset over the lease term. Payments are recorded as reductions to the liability with an appropriate interest charge recorded based on the then-outstanding remaining liability.

The Company considers the nature of the renovations and the Company's involvement during the construction period of newly leased office space to determine if it is considered to be the owner of the construction project during the construction period. If the Company determines that it is the owner of the construction project, it is required to capitalize the fair value of the building as well as the construction costs incurred, including capitalized interest, on its consolidated balance sheet along with a corresponding financing liability ("build-to-suit accounting"). Upon completion of the construction of the facility under a build-to-suit lease, the Company assesses whether the circumstances qualify for sales recognition under the sale-leaseback accounting guidance. If the lease meets the sale-leaseback criteria, the Company will remove the asset and related financial obligation from the balance sheet and evaluate the lease for treatment as a capital or operating lease. If upon completion of construction, the project does not meet the sale-leaseback criteria, the leased property will be treated as an asset financing for financial reporting purposes. The portion of the facility financing obligation representing the principal that will be repaid in the next 12 months will be classified as a current liability in the consolidated balance sheets, with the remaining portion of the obligation classified as a noncurrent liability. See Note 6—Commitments and Contingencies for further discussion of the Company's application of this guidance related to the Company's primary facility lease.

Impairment of Long-Lived Assets

Long-lived assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Recoverability of assets to be held and used is measured by a comparison of the carrying amount of an asset to estimated undiscounted future cash flows expected to be generated by the asset. If the carrying amount of an asset exceeds its estimated future cash flows, an impairment charge is recognized for an amount by which the carrying amount of the asset exceeds the fair value of the asset. There were no impairments of long-lived assets during the years ended December 31, 2017, 2016 and 2015.

Deferred Offering Costs

Deferred offering costs consisting of legal, accounting, filing and other fees directly related to offerings or the Company's shelf registration, are offset against proceeds from each offering as applicable. Offering costs incurred prior to the completion of an offering are initially capitalized as assets, evaluated each period for likelihood of completion and subsequently reclassified to additional paid-in capital upon completion of the offering. Deferred cost associated with the shelf registration will be reclassified to additional paid in capital on a pro-rata basis in the event the Company completes an offering under the shelf registration, with any remaining deferred offering costs charged to general and administrative expense at the end of the three-year life of the shelf registration.

Revenue Recognition—Licensing Arrangements

The Company entered into a licensing arrangement in the first quarter of 2017 and may enter into additional licensing arrangements in the future, in exchange for non-refundable upfront payments and potential future milestone and royalty payments. Such arrangements include multiple elements, including the sale of licenses and the

provision of services. Under U.S. GAAP effective as of and during the year ended December 31, 2017, for arrangements that involve the delivery of more than one element, each product, service and/or right to use assets is evaluated to determine whether it qualifies as a separate unit of accounting. This determination is based on whether the deliverable has "stand-alone value" to the licensee. The consideration that is fixed or determinable is then allocated to each separate unit of accounting based on the relative selling prices of each deliverable. The consideration allocated to each unit of accounting is recognized as the related goods and services are delivered, limited to the consideration that is not contingent upon future deliverables. When an arrangement is accounted for as a single unit of accounting, we determine the period over which the performance obligations will be performed and revenue recognized. Management exercises significant judgment in the determination of (i) whether a deliverable has stand-alone value, (ii) whether the deliverable is considered to be a separate unit of accounting and (iii) the estimation of the relative fair value of each deliverable in the arrangement.

The Company recognizes a milestone payment when earned if it is substantive and the Company has no ongoing performance obligations related to the milestone. A milestone payment is considered substantive if it: (i) is commensurate with either the Company's performance to achieve the milestone or the enhanced value of the delivered item as a result of a specific outcome from the performance to achieve the milestone; (ii) relates solely to past performance; and (iii) is reasonable relative to all of the deliverables and payment terms, including consideration of other potential milestones, within the arrangement.

Amounts received prior to satisfying all revenue recognition criteria are recorded as deferred revenue in the accompanying balance sheets. See Note 4—Collaboration Arrangements for further information and accounting considerations related to licensing arrangements revenue recognition.

Revenue Recognition—Research and Development Services

During 2017, the Company entered into an arrangement to provide research and development services on a fee-for-service basis and may enter into additional arrangements in the future. Pursuant to U.S. GAAP that is effective as of and during the year ended December 31, 2017, under such arrangements, revenue is recognized when all of the following conditions are met: (i) persuasive evidence of an arrangement exists, (ii) delivery has occurred or services have been rendered, (iii) fees are fixed or determinable, and (iv) collection of fees is reasonably assured. The Company's contract research and development services revenue is recognized in the period in which the services are performed.

During the year ended December 31, 2017, the Company recognized $375 in research and development services revenue for services performed under the KNOW Bio Services Agreement and had current deferred revenue related to these services of $35 as of December 31, 2017.

Research and Development Expenses

Research and development expenses include all direct and indirect development costs incurred for the development of the Company's drug candidates. These expenses include salaries and related costs, including stock-based compensation and travel costs, for research and development personnel, consulting fees, product development, preclinical studies, clinical trial costs, licensing fees and milestone payments under license agreements and other fees and costs related to the development of the drug candidates. The cost of tangible and intangible assets that are acquired for use on a particular research and development project, have no alternative future uses, and are not required to be capitalized in accordance with the Company's capitalization policy, are expensed as research and development costs as incurred.

Research and Development Expense Accruals

The Company is required to estimate its expenses resulting from its obligations under contracts with clinical research organizations, clinical site agreements, vendors, and consultants in connection with conducting clinical trials and preclinical development. The financial terms of these contracts are subject to negotiations which vary from contract to contract and may result in payment flows that do not match the periods over which materials or services are provided to the Company under such contracts. The Company's objective is to reflect the appropriate

development and clinical trial expenses in its financial statements by matching those expenses with the period in which the services and efforts are expended.

For clinical trials, the Company accounts for these expenses according to the progress of the trial as measured by actual hours expended by contract research organization (CRO) personnel, investigator performance or completion of specific tasks, patient progression, or timing of various aspects of the trial. During the course of a clinical trial, the Company adjusts its rate of clinical trial expense recognition if actual results differ from its estimates. The Company utilizes judgment and experience to estimate its accrued expenses as of each balance sheet date in its financial statements based on facts and circumstances known at that time. Although the Company does not expect its estimates to be materially different from amounts actually incurred, its understanding of status and timing of services performed relative to the actual status and timing of services performed may vary and may result in increases or decreases in research and development expenses in future periods when the actual results become known.

For preclinical development services performed by outside service providers, the Company determines accrual estimates through financial models, taking into account development progress data received from outside service providers and discussions with applicable Company and service provider personnel.

Share-Based Compensation

The Company applies the fair value method of accounting for share-based compensation, which requires all such compensation to employees, including the grant of employee stock options, to be recognized in the statement of operations based on its fair value at the measurement date (generally the grant date). The expense associated with share-based compensation is recognized over the requisite service period of each award. For awards with only service conditions and graded-vesting features, the Company recognizes compensation cost on a straight-line basis over the requisite service period. For awards with performance conditions, once achievement of the performance condition becomes probable, compensation cost is recognized over the expected period from the date the performance condition becomes probable to the date the performance condition is expected to be achieved. The Company will reassess the probability of vesting at each reporting period for performance awards and adjust compensation cost based on its probability assessment. Share-based awards granted to non-employee directors as compensation for serving on the Company's board of directors are accounted for in the same manner as employee share-based compensation awards.

The fair value of each option grant is estimated using a Black-Scholes option-pricing model on the grant date using expected volatility, risk-free interest rate, expected life of options and fair value per share assumptions. Due to limited historical data, the Company estimates stock price volatility based on the actual volatility of comparable publicly traded companies over the expected life of the option. In evaluating similarity, the Company considered factors such as industry, stage of life cycle, financial leverage, size and risk profile.

The Company does not have sufficient stock option exercise history to estimate the expected term of employee stock options and thus continues to calculate expected life based on the mid-point between the vesting date and the contractual term, which is in accordance with the simplified method. The expected term for share-based compensation granted to non-employees is the contractual life. The risk-free rate is based on the U.S. Treasury yield curve during the expected life of the option.

For option grants occurring prior to the Company's IPO in September 2016, the fair value of common stock was estimated by a third-party valuation specialist and approved by the board of directors as of the grant date. For options granted to non-employee directors on September 20, 2016 in conjunction with the pricing of the IPO, pursuant to the non-employee director compensation policy then in effect, the fair value of common stock was equal to the public offering price of $11.00 per share. For option grants occurring subsequent to the Company's IPO in September 2016, the fair value of common stock will be based upon the closing stock price as of the grant date.

Income Taxes

Deferred tax assets and liabilities are determined based on the temporary differences between the financial statement carrying amounts and the tax bases of assets and liabilities using the enacted tax rates in effect in the years in which the differences are expected to reverse. In estimating future tax consequences, all expected future events are considered other than enactment of changes in the tax law or rates.

The Company recognizes the tax benefit from an uncertain tax position only if it is more likely than not that the tax position will be sustained on examination by the taxing authorities based on the technical merits of the position.

The Company's policy for recording interest and penalties is to record them as a component of general and administrative expenses. As of December 31, 2017, 2016 and 2015, the Company accrued no interest and penalties related to uncertain tax positions.

Tax years that remain subject to examination by federal and state tax jurisdictions date back to the year ended December 31, 2008. The Company has not been informed by any tax authorities for any jurisdiction that any of its tax years are under examination.

The determination of recording or releasing a tax valuation allowance is made, in part, pursuant to an assessment performed by management regarding the likelihood that the Company will generate future taxable income against which benefits of its deferred tax assets may or may not be realized. This assessment requires management to exercise judgment and make estimates with respect to its ability to generate taxable income in future periods.

In accordance with Section 382 of the Internal Revenue Code of 1986, as amended, a change in equity ownership of greater than 50% within a three-year period results in an annual limitation on the Company's ability to utilize its net operating loss carryforwards created during the tax periods prior to the change in ownership. The Company has not determined whether ownership changes exceeding this threshold, including the Company's IPO, have occurred. If a change in equity ownership has occurred which exceeds the Section 382 threshold, a portion of the Company's net operating loss carryforwards may be limited.

Comprehensive Loss

Comprehensive loss is defined as the change in equity of a business enterprise during a period from transactions and other events and circumstances from non-owner sources. For the years ended December 31, 2017, 2016 and 2015, comprehensive loss was equal to net loss.

Net Loss Per Share

Basic net loss per share is calculated by dividing net loss by the weighted average shares outstanding during the period, without consideration for common stock equivalents. Diluted net loss per share is calculated by adjusting weighted average shares outstanding for the dilutive effect of common stock equivalents outstanding for the period. Diluted net loss per share is the same as basic net loss per share, since the effects of potentially dilutive securities are antidilutive for all periods presented.

The following securities, presented on a common stock equivalent basis, have been excluded from the calculation of weighted average common shares outstanding for the years ended December 31, 2017, 2016 and 2015 because the effect is anti-dilutive due to the net loss reported in each of those periods. All share amounts presented in the table below represent the total number outstanding as of the end of each period. The convertible preferred stock securities will no longer be potentially dilutive in future periods because, as discussed above, in September 2016, upon completion of the IPO, all outstanding shares of the convertible preferred stock were converted into shares of common stock at their conversion prices.

	December 31,		
	2017	2016	2015
Convertible preferred stock	—	—	8,776,269
Stock options outstanding	1,399,484	825,130	458,234

Segment and Geographic Information

The Company has determined that it operates in one segment. The Company uses its nitric oxide-based technology to develop product candidates. The Chief Executive Officer, who is the Company's chief operating decision maker, reviews financial information on an aggregate basis for purposes of allocating resources and evaluating financial performance.

Although all operations are based in the United States, the Company generated revenue of $1,765, or 82% of total revenue, from its licensing partner in Japan during the year ended December 31, 2017. Revenues are attributed to countries based on the location of the partner or customer.

Recently Issued Accounting Standards

Accounting Pronouncements Adopted

In March 2016, the FASB issued ASU No. 2016-09, *Compensation—Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting.* The FASB issued ASU 2016-09 to simplify several aspects of the accounting for share-based payment transactions, including the income tax consequences. This ASU is effective for annual and interim periods beginning after December 15, 2016, with early adoption permitted. This standard was effective for the Company as of January 1, 2017. The adoption of this standard did not have a material impact on its consolidated financial statements.

In October 2016, the FASB issued ASU No. 2016-17, *Consolidation (Topic 810): Interests Held through Related Parties That Are under Common Control,* which amends the consolidation guidance on how a reporting entity that is a single decision maker of a variable interest entity should treat indirect interests in the entity held through related parties that are under common control. This guidance is effective for annual periods beginning after December 15, 2016, including interim periods within those annual periods, with early adoption permitted. This ASU was effective for the Company as of January 1, 2017. Adoption of this standard did not have a material impact on its consolidated financial statements.

Accounting Pronouncements Being Evaluated

In May 2014, the FASB and the International Accounting Standards Board issued a converged standard on the recognition of revenue from contracts with customers. The converged standard has been codified within Topic 606, *Revenue from Contracts with Customers* of the FASB Accounting Standard Codification (ASC). The objective of the new standard is to establish a single comprehensive revenue recognition model that is designed to create greater comparability of financial statements across industries and jurisdictions. Under the new standard, companies will recognize revenue to depict the transfer of goods or services to customers in amounts that reflect the consideration to which a company expects to be entitled in exchange for those goods or services. The new standard also will require expanded disclosures on revenue recognition and changes in assets and liabilities that result from contracts with customers. As amended, the effective date of the new standard is January 1, 2018 for calendar year end companies. Since ASU 2014-09 was issued, FASB has issued and incorporated several additional ASUs to provide expanded or clarifying guidance within Topic 606.

The Company is adopting the new standard as of January 1, 2018 and will use the full retrospective adoption method, which will require the Company to recast each prior reporting period presented. The Company's material revenues are derived from the Sato Agreement, which provides for consideration in the form of an upfront payment, milestone payments, and royalties. As part of the Company's adoption efforts, management has completed an assessment of its revenue accounting for the Sato Agreement under Topic 606. The Company has concluded that there are four contractual terms within the Sato Agreement, that these contractual terms are not distinct but should be bundled together in one bundled performance obligation, and that revenue recognition should occur over time for the bundled performance obligation using a time-based input method that results in straight-line recognition over period that is materially consistent with the period used under previous GAAP. The Company has determined that certain variable consideration in the form of future milestone payments should be included in the transaction price at inception and is allocable to the performance obligations, which results in earlier revenue recognized for this

variable consideration under Topic 606, as compared to the Company's recognition policy under previous GAAP. The Company expects a licensing revenue increase of approximately 30% in the year ended December 31, 2017 as a result of adoption of the new standard. The impact of the new standard will be finalized upon adoption in the first quarter of 2018 and is therefore subject to change.

In February 2016, the FASB issued ASU No. 2016-02, *Leases (Topic 842)*. This guidance revises the accounting related to leases by requiring lessees to recognize a lease liability and a right-of-use asset for all leases. The new lease guidance also simplifies the accounting for sale and leaseback transactions. This ASU is effective for annual reporting periods beginning after December 15, 2018 and early adoption is permitted. The Company is currently evaluating the impact of the adoption of this ASU on its consolidated financial statements.

In August 2016, the FASB issued ASU No. 2016-15, *Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments.* The FASB issued ASU 2016-15 to improve U.S. GAAP by providing guidance on the cash flow statement classification of eight specific areas where there is existing diversity in practice. The FASB expects that the guidance in this ASU will reduce the current and potential future diversity in practice in such areas. This ASU is effective for annual and interim periods beginning after December 15, 2017, with early adoption permitted. This ASU is effective for the Company as of January 1, 2018. The adoption of this new accounting guidance is not expected to have a material effect on the Company's consolidated financial statements.

In November 2016, the FASB issued ASU No. 2016-18, *Statement of Cash Flows (Topic 230): Restricted Cash,* to improve U.S. GAAP by providing guidance on how to classify and present changes in restricted cash or restricted cash equivalents occurring due to transfers between cash, cash equivalents and restricted cash. This ASU is effective for annual and interim periods beginning after December 15, 2017, with early adoption permitted. This ASU is effective for the Company as of January 1, 2018. The Company's restricted cash will be presented in conformance with the requirements in this ASU but does not expect this presentation to have a material effect on the Company's consolidated financial statements.

In January 2017, the FASB issued ASU No. 2017-01, *Business Combinations (Topic 805): Clarifying the Definition of a Business*, which clarifies the definition of a business to provide additional guidance with evaluating whether transactions should be accounted for as acquisitions (or disposals) of assets or businesses. This ASU is effective for annual periods beginning after December 15, 2017, including interim periods within those periods. This ASU is effective for the Company as of January 1, 2018. The adoption of this new accounting guidance is not expected to have a material effect on the Company's consolidated financial statements.

In May 2017, the FASB issued ASU No. 2017-09, *Compensation-Stock Compensation (Topic 718): Scope of Modification Accounting,* to clarify and reduce diversity in practice and cost and complexity of applying guidance for modifications in Topic 718. Specifically, this ASU further defines which changes to terms or conditions of share-based awards require application of modification accounting in Topic 718. This ASU is effective for annual periods beginning after December 15, 2017, including interim periods within those periods, with early adoption permitted. This ASU is effective for the Company as of January 1, 2018. The adoption of this new accounting guidance is not expected to have a material effect on the Company's consolidated financial statements.

Note 2: Discontinued Operations

On December 14, 2015, the board of directors of Novan approved the separation of its non-dermatological assets and rights from Novan, Inc. through the Distribution. To consummate the Distribution, the Company's board of directors declared a pro rata dividend of KNOW Bio member units to Novan's stockholders of record as of the close of business on December 29, 2015 (the "Record Date"). Each Novan stockholder received one member unit of KNOW Bio for every share of Novan preferred or common stock held at the close of business on the Record Date. The Distribution occurred on December 30, 2015 (the "Distribution Date"). Immediately following the Distribution, KNOW Bio became an independent, privately-held company and the Company does not own an equity interest in KNOW Bio and has no significant influence by contract or other means. The results of KNOW Bio have been classified as discontinued operations in the consolidated statements of operations for all periods presented. Additionally, the related liabilities outstanding as of December 31, 2015 not assumed by KNOW Bio as part of the Distribution are classified as discontinued operations in the accompanying consolidated balance sheets.

At the Distribution Date, KNOW Bio had cash of $5,200 and equipment of $125. The cash included in the Distribution was recorded as a dividend distribution in the statement of cash flows. Certain intellectual property rights were licensed to KNOW Bio as further described in Note 4—Collaboration Arrangements.

The financial results of KNOW Bio through the Distribution are presented as loss from discontinued operations in the consolidated statements of operations. The following table presents the financial results of KNOW Bio:

	Year Ended 2015
Federal research contract and grant revenue	$ 229
Operating expenses:	
Research and development	1,826
General and administrative	677
Total operating expenses	2,503
Loss from discontinued operations	$ (2,274)

Note 3: Research and Development Licenses

The Company has entered into various licensing agreements with universities and other research institutions under which the Company receives the rights, and in some cases substantially all of the rights, of the inventors, assignees or co-assignees to produce and market technology protected by certain patents and patent applications. The Company's primary license agreement is with UNC and has been described in further detail within the subsection below. The counterparties to the Company's various other licensing agreements are the University of Akron Research Foundation, Hospital for Special Surgery, Strakan International S.a.r.l., which is a licensee of the University of Aberdeen, KIPAX AB and KNOW Bio. The Company is generally required to make milestone payments based on development milestones and will be required to make royalty payments based on a percentage of future sales of covered products or a percentage of sublicensing revenue. Costs to acquire rights under license agreements and pre-commercialization milestone payments are classified as research and development expenses in the consolidated statements of operations. Research and development expense recognized in connection with the incurrence of such costs totaled $250, $125 and $260 during the years ended December 31, 2017, 2016 and 2015, respectively.

The Company is generally required by the various licensing agreements to reimburse the licensor for certain legal and other patent related costs. These costs are expensed as incurred and are classified as general and administrative expenses in the consolidated statements of operations. General and administrative expense recognized in connection with the incurrence of such costs totaled $58, $87 and $112 during the years ended December 31, 2017, 2016 and 2015, respectively.

These license arrangements could require the Company to make payments upon achievement of certain milestones by the Company. As future royalty payments are directly related to future revenues (either sales or sublicensing), future commitments cannot be determined. No accrual for future payments under these agreements has been recorded, as the Company cannot estimate if, when or in what amount payments may become due.

UNC License Agreement

The Amended, Restated and Consolidated License Agreement dated June 27, 2012, as amended, (the "UNC Agreement") provides the Company with an exclusive license to issued patents and pending applications directed to the Company's library of Nitricil compounds, including patents issued in the U.S., Japan and Australia, with claims intended to cover NVN1000, the new chemical entity ("NCE") for the Company's current product candidates. The UNC Agreement requires the Company to pay UNC up to $425 in regulatory and commercial milestones on a licensed product by licensed product basis and a running royalty percentage in the low single digits on net sales of licensed products. Licensed products include any products being developed by the Company or by its sublicensees, KNOW Bio and Sato Pharmaceutical Co., Ltd. ("Sato"), as described further in Note 4—Collaboration Arrangements. Additionally, the Company made a payment to UNC in February 2017 representing the portion of the upfront payment under the Sato Agreement that was estimated to be directly attributable to the UNC intellectual

property rights included in the license to Sato. See Note 4—Collaboration Arrangements for the Company's accounting for this February 2017 payment.

Unless earlier terminated by the Company at its election, or if the Company materially breaches the agreement or becomes bankrupt, the UNC Agreement remains in effect on a country by country and licensed product by licensed product basis until the expiration of the last to expire issued patent covering such licensed product in the applicable country. The projected date of expiration of the last to expire of the patents issued under the UNC Agreement is 2033.

Note 4: Collaboration Arrangements

KNOW Bio Technology Agreements

In connection with the Distribution, the Company entered into exclusive license agreements and sublicense agreements with KNOW Bio, as described below. The agreements will continue for so long as there is a valid patent claim under the respective agreement, unless earlier terminated, and upon expiration, will continue as perpetual non-exclusive licenses. KNOW Bio has the right to terminate each such agreement, for any reason upon 90 days advance written notice to the Company.

License of existing and potential future intellectual property to KNOW Bio. The Company granted to KNOW Bio exclusive licenses, with the right to sublicense, to certain U.S. and foreign patents and patent applications controlled by the Company as of December 29, 2015 (the "KNOW Bio License Agreement"). The Company also granted to KNOW Bio a non-exclusive license, with the right to sublicense, to any patents and patent applications that may become controlled by the Company during the three years immediately following the agreement's effective date related to nitric oxide-releasing compositions and methods of manufacturing thereof, including methods of manufacturing and other nitric oxide-based therapeutics.

Sublicense of UNC and other third party intellectual property to KNOW Bio. The Company also granted to KNOW Bio exclusive sublicenses, with the ability to further sublicense, under certain of the U.S. and foreign patents and patent applications exclusively licensed to the Company from UNC and another third party directed towards nitric oxide-releasing compositions, to develop and commercialize products utilizing the licensed technology (the "KNOW Bio Sublicense Agreements"). Under the exclusive sublicense to the UNC patents and applications, KNOW Bio is subject to the terms and conditions under the UNC License Agreement, including milestone and diligence payment obligations. However, the Company is obligated to pay UNC any future milestones or royalties in the event of KNOW Bio non-performance under the sublicense arrangement. In such an event, KNOW Bio would be in breach of its agreements with the Company and intellectual property rights would revert back to the Company. There were no milestone or royalty payments required during the years ended December 31, 2017, 2016 and 2015.

Amendments to License and Sublicense Agreements with KNOW Bio

The Company and KNOW Bio entered into certain amendments dated October 13, 2017 (the "KNOW Bio Amendments") to the KNOW Bio License Agreement and KNOW Bio Sublicense Agreements (the "Original KNOW Bio Agreements") described above. Pursuant to the terms of the KNOW Bio Amendments, the Company re-acquired from KNOW Bio exclusive, worldwide rights under certain U.S. and foreign patents and patent applications controlled by the Company as of the execution date of the Original KNOW Bio Agreements, and patents and patent applications which may become controlled by the Company during the three years immediately following the execution date of the Original KNOW Bio Agreements, directed towards nitric oxide-releasing compositions and methods of manufacturing thereof, including methods of manufacturing Nitricil compounds, and other nitric oxide-based therapeutics, to develop and commercialize products for all diagnostic, therapeutic, prophylactic and palliative uses for any disease, condition or disorder caused by certain oncoviruses (the "Oncovirus Field"). KNOW Bio also granted to the Company an exclusive license, with the right to sublicense, under any patents and patent applications which may become controlled by KNOW Bio during the three years immediately following the execution date of the Original KNOW Bio Agreements and directed towards nitric oxide-releasing compositions and methods of manufacturing thereof, including methods of manufacturing Nitricil compounds, and other nitric oxide-based therapeutics, but not towards medical devices, to develop and commercialize products for use in the Oncovirus Field. Additionally, KNOW Bio agreed that KNOW Bio will not commercialize any products

in the Oncovirus Field during the first three years following the execution date of the Original KNOW Bio Agreements.

The Company is obligated to make the following fixed and contingent payments in exchange for the rights granted to the Company in the Oncovirus Field:

(ii) A non-refundable upfront payment of $250 due upon execution of the KNOW Bio Amendments, which was paid in October 2017 and is classified as research and development expense in the consolidated statements of operations.

(iii) For products that incorporate a certain nitric oxide-releasing composition specified in the KNOW Bio Amendments and (i) are covered by KNOW Bio patents or (ii) materially use or incorporate know-how of KNOW Bio or the Company related to such composition that is created during the three years immediately following the execution date of the Original KNOW Bio Agreements ("Covered Products"), the Company must make the following payments to KNOW Bio:

- A milestone payment upon the first time each Covered Product is approved by the U.S. Food and Drug Administration ("FDA") for marketing in the Oncovirus Field;
- A royalty in the low single digits on net sales of Covered Products in the Oncovirus Field until the later of the expiration of the KNOW Bio patents covering the applicable Covered Product or the expiration of regulatory exclusivity on the applicable Covered Product; and
- In the event the Company sublicenses the rights to a Covered Product to a third party in the Oncovirus Field, the Company must pay KNOW Bio a low double-digit percentage of any clinical development or NDA approval milestones the Company receives from the sublicensee for the Covered Product in the Oncovirus Field.

Nitricil is not the nitric oxide-releasing composition specified in the KNOW Bio Amendments as the subject of the foregoing payments. As such, products based on Nitricil are not subject to the foregoing milestone, royalty and sublicensing payment obligations.

The rights granted to the Company in the Oncovirus Field in the KNOW Bio Amendments continue for so long as there is a valid patent claim under the Original KNOW Bio Agreements, and upon expiration continue on a perpetual non-exclusive basis, and are subject to the termination rights of KNOW Bio and the Company that are set forth in the Original KNOW Bio Agreements. In addition, under the KNOW Bio Amendments, KNOW Bio may terminate the rights granted to the Company in the Oncovirus Field if: (i) the Company does not file a first investigational new drug ("IND") application with the FDA for a product in the Oncovirus Field by October 2020; or (ii) the Company does not file a first new drug application ("NDA") with the FDA by October 2025 for a product in the Oncovirus Field and does not otherwise have any active clinical programs related to the Oncovirus Field at such time.

The Company also obtained a three-year exclusive option to include within the Company's rights described above in the Oncovirus Field, the development and commercialization of products for all diagnostic, therapeutic, prophylactic and palliative uses for any disease, condition or disorder caused by up to four other specified oncoviruses (the "Option Field"). If the Company elects to exercise its option, it will pay an exercise fee for each oncovirus for which the option is exercised, and the additional rights included in the Oncovirus Field as a result of the option exercise will be subject to the same payment obligations for Covered Products, conditions, and termination rights as described above for the Oncovirus Field.

The KNOW Bio Amendments also provide a mechanism whereby either party can cause an NCE covered by the Original KNOW Bio Agreements to become exclusive to such party by filing an IND on the NCE. An NCE that becomes exclusive to a party under this provision may not be commercialized by the other party until the later of expiration of patents covering the NCE or regulatory exclusivity covering the NCE. A party who obtains exclusivity for an NCE must advance development of the NCE pursuant to terms of the KNOW Bio Amendments in order to maintain such exclusivity; otherwise, such exclusivity will expire.

The terms of the KNOW Bio Amendments were negotiated at arms-length and do not provide the Company with an ability to significantly influence KNOW Bio or its operations.

Sato License Agreement

Significant Terms

On January 12, 2017, the Company entered into a license agreement, and related amendment, with Sato, relating to SB204, its drug candidate for the treatment of acne vulgaris in Japan (the "Sato Agreement"). Pursuant to the Sato Agreement, the Company granted to Sato an exclusive, royalty-bearing, non-transferable right and license under certain of the Company's intellectual property rights, with the right to sublicense with the Company's prior written consent, to develop, use and sell products in Japan that incorporate SB204 in certain topical dosage forms for the treatment of acne vulgaris, and to make the finished form of such products. The Company, or its designated contract manufacturer, will also supply finished product to Sato for use in the development of SB204 in the licensed territory. The rights granted to Sato do not include the right to manufacture the active pharmaceutical ingredient ("API") of SB204; rather, the parties agreed to negotiate a commercial supply agreement pursuant to which the Company or a third party contract manufacturer would be the exclusive supplier to Sato of the API for the commercial manufacture of licensed products in the licensed territory. Under the terms of the Sato Agreement, the Company also has exclusive rights to certain intellectual property that may be developed by Sato in the future, which the Company could choose to use for its own development and commercialization of SB204 outside of Japan.

Pursuant to the terms of the Sato Agreement, Sato had an exclusive option to negotiate for the license rights in certain additional territories within Asia, subject to Sato's payment of a specified option exercise fee. During the third quarter of 2017, Sato elected not to execute this option. This option expired, unexercised on September 30, 2017.

In exchange for the licenses granted to Sato under the Sato Agreement, Sato agreed to pay the Company an upfront payment, as well as additional milestone payments upon achievement of various future development, regulatory and commercial milestones. Pursuant to the terms of the Sato Agreement, Sato was required to pay the Company an upfront payment of 1.25 billion Japanese Yen ("JPY"), which the Company received in January 2017 in the amount of $10,813 when converted to U.S. Dollars. Sato is also required to pay the Company an aggregate of 2.75 billion JPY upon the achievement of various development and regulatory milestones. Under the Sato Agreement, Sato also agreed to pay the Company up to an aggregate of 0.9 billion JPY in milestone payments upon the achievement of various commercial milestones. Sato must also pay the Company a royalty equal to a mid-single digit percentage of net sales of licensed products in the licensed territory, subject to a reduction in the royalty payments in certain circumstances.

The term of the Sato Agreement and the period during which Sato must pay royalties under the Sato Agreement expires, on a licensed product-by-licensed product basis, on the tenth anniversary of the first commercial sale of a licensed product in the licensed field in the licensed territory. The term of the Sato Agreement may be renewed with respect to a licensed product by mutual written agreement of the parties for additional two year periods following expiration of the initial term.

The Company, by itself or through its designated third party contract manufacturer, is obligated pursuant to the Sato Agreement to supply Sato with all quantities of licensed products required by Sato to develop the licensed products in the licensed field in the licensed territory. As part of the Sato Agreement, the Company and Sato have also agreed to negotiate a commercial supply agreement pursuant to which the Company, by itself or through its designated third party contract manufacturer, would be the exclusive supplier to Sato of the API of licensed products for the manufacture of licensed products in the licensed territory.

Sato is responsible for funding the development and commercial costs for the program that are specific to Japan. The Company is obligated to perform certain oversight, review and supporting activities for Sato, including: (i) using commercially reasonable efforts to obtain marketing approval of SB204 in the U.S, (ii) sharing all future scientific information the Company may obtain during the term of the Sato Agreement pertaining to SB204, (iii) performing certain additional pre-clinical studies if such studies are deemed necessary by the Japanese regulatory authority, up to and not to exceed a total cost of $1,000 and (iv) participating in a joint committee that oversees, reviews and

approves Sato's development and commercialization activities under the Sato Agreement. Additionally, the Company has granted Sato the option to use the Company's trademarks in connection with the commercialization of licensed products in the licensed territory for no additional consideration, subject to the Company's approval of such use.

The Sato Agreement may be terminated by (i) Sato without cause upon 120 days' advance written notice to the Company, (ii) either party in the event of the other party's uncured material breach upon 60 days' advance written notice, (iii) force majeure, (iv) either party in the event of the other party's dissolution, liquidation, bankruptcy or insolvency and (v) the Company immediately upon written notice if Sato challenges the validity, patentability, or enforceability of any of the Company's patents or patent applications licensed to Sato under the Sato Agreement. In the event of a termination, no portion of the upfront fee received from Sato in January 2017 is refundable.

Accounting Considerations and Revenue Recognition

The Company has identified the following four performance deliverables under the Sato Agreement: (i) the grant of the intellectual property license to Sato, (ii) the obligation to participate in a joint committee that oversees, reviews, and approves Sato's research and development activities and provides advisory support during Sato's development process, (iii) the obligation to manufacture and supply Sato with all quantities of licensed product required for development activities in Japan, and (iv) the grant of an optional right to use the Company's trademark. The Sato Agreement also contains an obligation to negotiate terms of a commercial supply agreement that will provide for the manufacture and supply all quantities of the API contained in the licensed product manufactured by Sato for commercial sale in Japan. The Company concluded this commercial supply obligation was a contingent deliverable because SB204 is not yet a commercially approved product and is currently subject to additional clinical studies prior to commercial approval in Japan. The Company considered the provisions of the multiple-elements arrangement guidance and determined that none of the deliverables have standalone value because Sato's ability to utilize the value of the licensed intellectual property rights is limited absent the delivery of the other elements of the arrangement. In particular, the Company has maintained control of the methods and expertise necessary to manufacture and supply the API in the licensed product, which limits the utility and causes an interdependency of the remaining elements on the delivery of quantities of licensed product required for development activities in Japan. As a result, all deliverables have been combined into a single unit of accounting.

The Company evaluated the timing of delivery for each of the deliverables and concluded that its obligation to participate on the joint committee during Sato's development process would be the last delivered element under the arrangement and therefore would be the basis for revenue recognition for the combined unit of accounting. The Company began to participate on the joint committee in March 2017 and currently estimates that its participation will continue through the first quarter of 2022. This time period is the Company's estimated performance period, which the Company monitors and reassesses during each reporting period. The total upfront consideration under this agreement is being recognized as license and collaboration revenue on a straight-line basis over the estimated performance period. Prior to the third quarter of 2017, the Company had estimated that its participation in the joint committee would continue through the third quarter of 2021. The change in estimate resulted in a $137 decrease in revenue recognized during the year ended December 31, 2017 as compared to the revenue that would have been recognized using the previously estimated performance period. The change in estimate does not affect the total amount of revenue expected to be recognized over the term of the Sato Agreement.

The Company determined that the future contingent payments meet the definition of a milestone. The development and regulatory milestones are not considered to be substantive because they do not relate solely to past performance. Accordingly, revenue for the achievement of development milestones will be recognized over the performance period, assuming collectability is reasonably assured. The revenue for the achievement of regulatory milestones will be recognized over the ten year commercial term of the Sato Agreement. As of December 31, 2017, no amounts have been recognized as license and collaboration revenue for any of these potential future milestones and all the contingent payments remained eligible for achievement as of December 31, 2017.

During the year ended December 31, 2017, the Company recognized $1,765 in license and collaboration revenue under this agreement. The deferred revenue balance pertaining to the Sato Agreement as of December 31, 2017 was $9,048, including $2,129 and $6,919 in current and non-current deferred revenue, respectively.

Contract Acquisition Costs

The intellectual property rights granted to Sato under the Sato Agreement include certain intellectual property rights which the Company has licensed from UNC. Under the Company's license agreement with UNC described in Note 3—Research and Development Licenses, the Company is obligated to pay UNC a running royalty percentage in the low single digits on net sales of licensed products, including net sales that may be generated by Sato. Additionally, the Company made a payment to UNC in February 2017 representing the portion of the Sato upfront payment that was estimated to be directly attributable to the UNC intellectual property rights included in the license to Sato.

The Company also entered into an agreement with a third party to assist the Company in exploring the licensing opportunity which led to the execution of the Sato Agreement. The Company paid a fee of $216 to the third party upon execution of the Sato Agreement and is obligated to pay the third party a low-single-digit percentage of any future milestone payments the Company may receive from Sato under the Sato Agreement.

The fees associated with payments made to UNC and the third party have been capitalized as other assets, including current and noncurrent portions, in the accompanying balance sheet and are being amortized as general and administrative expense on a straight-line basis over the same estimated period used to recognize revenue on the upfront payment received from Sato.

Note 5: Property and Equipment, Net

Property and equipment consisted of the following:

	December 31,	
	2017	2016
Computer equipment	$ 529	$ 500
Furniture and fixtures	354	504
Laboratory equipment	6,819	5,723
Office equipment	400	106
Building related to facility lease obligation	10,557	10,557
Leasehold improvements	1,000	1,338
	19,659	18,728
Less: Accumulated depreciation and amortization	(3,035)	(2,438)
	$ 16,624	$ 16,290

Depreciation and amortization expense was $1,423, $757 and $631 for the years ended December 31, 2017, 2016 and 2015, respectively.

Note 6: Commitments and Contingencies

Lease Obligations

Primary Facility Lease

In August 2015, the Company entered into a lease agreement for approximately 51,000 rentable square feet of facility space in Morrisville, North Carolina, commencing in April 2016. The initial term of the lease agreement extends through June 30, 2026. The Company has an option to extend the lease agreement by five years upon completion of the initial lease term. Current contractual base rent payments are $93 per month, subject to a three percent increase annually over the term of the lease agreement.

As a result of the nature of and the involvement in the renovations during the construction period of the leased space, the Company was the "deemed owner," for accounting purposes only, of the construction project and was required to capitalize the fair value of the building as well as the construction costs incurred by either the landlord or the Company on its consolidated balance sheet pursuant to FASB ASC 840, *Leases*, and the accounting policy described in Note 1—Organization and Significant Accounting Policies. The Company determined that the facility was substantially complete as of December 31, 2016 because the Company began to utilize the facility for all

intended purposes, including primary research, development and drug compound manufacturing operations, in addition to administrative and corporate headquarters activities. Following the determination that the facility was substantially complete, the Company assessed the facility for sale-leaseback criteria qualification, which could result in a de-recognition of the building asset and the related financing obligation. The Company concluded that the facility did not meet the sale-leaseback criteria due to the Company's continuing involvement in the leased facility. As a result, the facility is being accounted for as an asset financing, with the building asset and related facility financing obligation remaining on the Company's balance sheet. The building asset is being depreciated over a 25 year period and the facility financing obligation will be amortized so that the net carrying value of the building asset and the facility financing obligation are equivalent at the end of the initial term of the lease agreement. Monthly rental payments will be allocated between principal and interest expense associated with the facility financing obligation, as well as grounds rent expense of $8 per month.

The Company has recorded an asset related to the building and construction costs within property and equipment of $10,557 as of December 31, 2017. The non-current facility lease obligation on the Company's consolidated balance sheet is $7,998 as of December 31, 2017 and 2016. During the year ended December 31, 2017, the Company recognized interest expense of $1,044, including $37 of accrued interest included in other accrued expenses as of December 31, 2017.

Future minimum payments, including interest, required under the Company's primary facility lease agreement, accounted for as an asset financing as of December 31, 2017 are as follows:

	Build-to-Suit Lease
2018	$ 1,135
2019	1,170
2020	1,205
2021	1,241
2022	1,278
Thereafter	4,784
Total minimum lease payments	$ 10,813

Operating Leases

The Company leased a facility under a non-cancelable operating lease that expired in April 2017.

Rent expense for operating leases totaled $440, $525 and $337 for the years ended December 31, 2017, 2016 and 2015, respectively.

Contingencies

From time to time, the Company may have certain contingent liabilities that arise in the ordinary course of business activities. The Company accrues a liability for such matters when it is probable that future expenditures will be made and such expenditures can be reasonably estimated. See *Legal Proceedings* below for further discussion of pending legal claims.

The Company has entered into, and expects to continue to enter into, contracts in the normal course of business with various third parties who support its clinical trials, preclinical research studies and other services related to its development activities. The scope of the services under these agreements can generally be modified at any time, and these agreements can generally be terminated by either party after a period of notice and receipt of written notice. There have been no material contract terminations as of December 31, 2017.

Legal Proceedings

The Company is subject to putative stockholder class action lawsuits that were filed in November 2017 in the United States District Court for the Middle District of North Carolina against the Company and certain of its current and

former directors and officers. The lawsuits were filed on behalf of a putative class of all persons who purchased or otherwise acquired the Company's securities (1) pursuant or traceable to the Company's IPO, or (2) on the open market between September 21, 2016 and January 26, 2017. The lawsuits assert claims for violation of Sections 11 and 15 of the Securities Act of 1933 and Sections 10(b) and 20(a) of the Exchange Act and SEC Rule 10b-5 promulgated thereunder, in connection with statements related to the Company's Phase 3 clinical trials of SB204. The complaints seek, among other things, an unspecified amount of compensatory damages and attorneys' fees and costs on behalf of the putative class. The Company believes that the claims lack merit and intends to defend the lawsuits vigorously. However, there can be no assurance that a favorable resolution will be obtained in such lawsuits, and the actual costs may be material.

Other than as described above, the Company is not currently a party to any material legal proceedings and is not aware of any claims or actions pending or threatened against the Company that the Company believes could have a material adverse effect on the Company's business, operating results, cash flows or financial statements. In the future, the Company might from time to time become involved in litigation relating to claims arising from its ordinary course of business.

Compensatory Obligations

In conjunction with the departures of two former Company officers in March and May of 2017, respectively, the Company entered into separation and general release agreements with both individuals that included separation benefits consistent with the Company's obligations under their previously existing employment agreements for "separation from service" for "good reason." The resulting combined severance expense recognized during the year ended December 31, 2017, totaled approximately $793. The remaining accrued severance obligation in respect of the two former officers was $235 as of December 31, 2017, which is included in accrued compensation in the accompanying consolidated balance sheet. The Company also recognized approximately $374 in stock compensation expense during the year ended December 31, 2017, related to the accelerated vesting of the former officers' stock options.

In June 2017, the Company reduced its overall employee workforce to reduce operating expenditures and preserve cash on hand. Employee severance costs associated with this action were $224, which were expensed during the second quarter of 2017. These severance costs were fully paid as of December 31, 2017.

Note 7: Stockholders' Equity

Capital Structure

Authorized Shares. In conjunction with the completion of the IPO in September 2016, the Company further amended its amended and restated certificate of incorporation and amended and restated its bylaws. The amendment provides for 210,000,000 authorized shares of capital stock, of which 200,000,000 shares have been designated as $0.0001 par value common stock, and 10,000,000 shares have been designated as $0.0001 par value preferred stock.

Prior to the September 2016 amendment, the Company was authorized to issue 36,729,263 shares of capital stock, of which 22,000,000 shares were designated as $0.0001 par value common stock, 229,263 shares as $0.0001 par value non-voting common stock, and 14,500,000 shares of $0.0001 par value convertible preferred stock. The authorized shares of convertible preferred stock were designated as follows: 1,229,862 as Series 1 Convertible Preferred Stock ("Series 1"), 1,226,242 as Series 2 Convertible Preferred Stock ("Series 2"), 1,349,382 as Series 3 Convertible Preferred Stock ("Series 3"), 1,833,333 as Series 4 Preferred Stock ("Series 4"), 3,677,622 as Mezzanine A Convertible Preferred Stock ("Mezzanine A") and 5,000,000 as Mezzanine B Convertible Preferred Stock ("Mezzanine B").

Convertible Preferred Stock

The Company issued multiple series of convertible preferred stock between 2008 and 2015. In September 2016, in conjunction with the Company's IPO, all outstanding shares of convertible preferred stock automatically converted into an aggregate of 8,776,269 shares of common stock at their conversion prices. The significant features of the

convertible preferred stock series in place immediately prior to the conversion to common shares are summarized in the subsection below.

Significant Features of Series 1, Series 2, Series 3, Series 4, Mezzanine A and Mezzanine B Convertible Preferred Stock

Voting. The holders of Series 1, Series 2, Series 3, Series 4, Mezzanine A and Mezzanine B were entitled to vote equally with the shares of common stock.

Dividends. Holders of preferred shares were entitled to dividends if and when declared by the board of directors. Other than the Distribution (see Note 1—Organization and Significant Accounting Policies), no dividends were declared prior to the IPO.

Conversion. Each share of Series 1, Series 2, Series 3, Series 4, Mezzanine A and Mezzanine B were convertible at the option of the holder at any time after the date of issuance into such a number of common shares as is determined by dividing the original issue price by the conversion price in effect at the time of the conversion. The conversion prices were subject to adjustment for subdivisions, dividends, combinations, reclassifications, merger, sale, etc. As discussed in Note 1—Organization and Significant Accounting Policies, the Company's 1-for-1.2 reverse stock split of the Company's shares of common stock resulted in a proportional adjustment to the existing conversion ratio of each series of convertible preferred stock, effective September 7, 2016.

Automatic Conversion. Each share of Series 1, Series 2, Series 3, Series 4, Mezzanine A and Mezzanine B automatically converted into common stock at the then effective conversion prices for each series upon the completion of the IPO of the Company's common stock because gross proceeds from the IPO exceeded $40,000.

Consent Rights. Without consent of the holders of a majority of Series 1, Series 2, Series 3, Series 4, Mezzanine A and Mezzanine B shares, the Company could not take certain actions, including liquidation, dissolution, recapitalization or reorganization; increase or decrease the number of authorized shares of preferred or common stock; authorize or issue shares of capital stock with preferences or priorities over the existing shares of preferred stock; or effect any amendment to the certificate of incorporation or bylaws of the Company which would have had an adverse effect on the holders of Series 1, Series 2, Series 3, Series 4, Mezzanine A and Mezzanine B.

Liquidation Preference. Upon liquidation, dissolution, or winding up of the Company, holders of the Mezzanine B would have been entitled to receive, prior and in preference to any distribution of the assets to holders of Mezzanine A, Series 4, Series 3, Series 2, Series 1 or common stock, an amount equal to the greater of the original purchase price or the per share amount on an as converted basis. After such distribution to the holders of Mezzanine B, the holders of Mezzanine A would have been entitled to receive, prior and in preference to any distribution of the assets to holders of Series 4, Series 3, Series 2, Series 1 or common stock, an amount equal to the greater of the original purchase price or the per share amount on an as converted basis. After such distribution to the holders of Mezzanine A, the holders of the Series 4 would have been entitled to receive, prior and in preference to any distribution of the assets to holders of Series 3, Series 2, Series 1 or common stock, an amount equal to the greater of the original purchase price or the per share amount on an as converted basis. After such distribution to the holders of Series 4, the holders of Series 3 would have been entitled to receive, prior and in preference to any distribution of the assets to holders of Series 2, Series 1 or common stock, an amount equal to the greater of the original purchase price or the per share amount on an as converted basis. After such distribution to the holders of Series 3, the holders of Series 2 would have been entitled to receive, prior and in preference to any distribution of the assets to holders of Series 1 or common stock, an amount equal to the greater of the original purchase price or the per share amount on an as converted basis. After such distribution to the holders of Mezzanine B, Mezzanine A, Series 4, Series 3 and Series 2, the holders of Series 1 would have been entitled to receive, prior and in preference to any distribution of the assets to holders of common stock, an amount equal to the greater of the original purchase price or the per share amount on an as converted basis. Any assets remaining after such preferential distributions would be distributed to holders of common stock.

Anti-Dilution. Series 1, Series 2, Series 3, Series 4, Mezzanine A and Mezzanine B had a weighted average anti-dilution provision which protected against stock splits, stock dividends and recapitalizations. Prior to the IPO, in September 2016, the Company's board of directors and existing stockholders approved a waiver of the existing

preferred stockholders' rights within the certificate of incorporation pertaining to (i) a notice requirement for the mandatory conversion of preferred stock to common stock in the IPO and (ii) the application of anti-dilution provisions with respect to issuance of common stock in the IPO.

Related Party Stock Repurchase

In April 2016, the Company repurchased 9,500 shares of common stock for an aggregate price of $155 from an executive of the Company who is also a member of the Company's board of directors. The repurchase of these shares is recorded as treasury stock on the Company's consolidated balance sheet as of December 31, 2017 and 2016.

Significant Features of Non-Voting Common Stock

Non-voting common stock had provisions for automatically converting into one share of common stock, as adjusted for any dividends and stock-splits, upon the closing of a qualified public offering of the Company's common stock. Other than the Distribution (see Note 1—Organization and Significant Accounting Policies), there were no previously declared dividends or stock-splits prior to the IPO. As discussed in Note 1—Organization and Significant Accounting Policies, the Company's stockholders approved a 1-for-1.2 reverse stock split of the Company's shares of common stock, including all outstanding non-voting common stock, effective September 7, 2016. Subsequently, in conjunction with the Company's IPO, all outstanding shares of non-voting common stock were converted into an aggregate of 191,052 shares of common stock.

Preferred Stock

The Company's amended and restated certificate of incorporation provides the Company's board of directors with the authority to issue $0.0001 par value preferred stock from time to time in one or more series by adopting a resolution and filing a certificate of designations. Voting powers, designations, preferences, dividend rights, conversion rights and liquidation preferences shall be stated and expressed in such resolutions. There were 10,000,000 shares designated as preferred stock and no shares outstanding as of December 31, 2017 and 2016.

Common Stock

Authorized, Issued and Outstanding Common Shares

The Company's common stock has a par value of $0.0001 per share and consists of 200,000,000 authorized shares as of December 31, 2017 and 2016. There were 16,005,408 and 15,939,992 shares of voting common stock outstanding as of December 31, 2017 and 2016, respectively.

The Company had reserved shares of common stock for future issuance as follows:

	December 31,	
	2017	2016
Outstanding stock options	1,399,484	825,130
For possible future issuance under 2016 Stock Plan (Note 8)	1,023,378	615,207
	2,422,862	1,440,337

Note 8: Stock Option Plan

2008 Stock Plan

During 2008, the Company adopted the 2008 Stock Plan (the "2008 Plan"). As amended, a total of 1,416,666 shares of common stock were reserved for issuance under the 2008 Plan. Eligible plan participants included employees, directors, and consultants. The 2008 Plan permitted the granting of incentive stock options, nonqualified stock options, and other stock-based awards. As further described below, as of September 20, 2016, no additional awards will be granted under the 2008 Plan.

2016 Stock Plan

Effective September 20, 2016 (the "Effective Date"), the Company adopted the 2016 Incentive Award Plan (the "2016 Plan"). The 2016 Plan is the successor to the 2008 Plan. As of the Effective Date, no additional awards will be granted under the 2008 Plan, but all stock awards granted under the 2008 Plan prior to the Effective Date will remain subject to the terms of the 2008 Plan. Any shares associated with stock awards previously granted under the 2008 Plan that are forfeited subsequent to the Effective Date of the 2016 Plan are not eligible for future issuance under the 2016 Plan. All awards granted on and after the Effective Date will be subject to the terms of the 2016 Plan. The 2016 Plan provides for the grant of the following awards: (i) incentive stock options, (ii) nonstatutory stock options, (iii) stock appreciation rights, (iv) restricted stock awards, (v) restricted stock unit awards and (vi) other stock awards. Eligible plan participants include employees, directors, and consultants. An aggregate of 833,333 shares of the Company's common stock were initially available for issuance under awards granted pursuant to the 2016 Plan, which shares may be authorized but unissued shares, treasury shares, or shares purchased in the open market.

On June 5, 2017, the Company's stockholders approved an amendment to the 2016 Plan to increase the aggregate number of shares of common stock that may be issued pursuant to awards under the 2016 Plan by an additional 1,200,000 shares. All other material terms of the 2016 Plan otherwise remained unchanged. As of December 31, 2017, there were 1,023,378 shares available for future issuance under the 2016 Plan.

Under both the 2008 Plan and the 2016 Plan, options to purchase the Company's common stock may be granted at a price no less than the fair value of a common stock share on the date of grant. The fair value shall be the closing sales price for a share as quoted on any established securities exchange for such grant date or the last preceding date for which such quotation exists. Vesting terms of options issued are determined by the board of directors or compensation committee of the board. The Company's stock options vest based on terms in the stock option agreements and have a maximum term of ten years.

Stock Compensation Expense

In December 2015, the board of directors approved the acceleration of each option holder's unvested options through the next annual anniversary of the grant's vesting commencement date provided that the option holder consents to the option acceleration in writing. As of December 31, 2015, 159,159 options were vested pursuant to this option acceleration and the Company recognized $1,312 of additional compensation expense.

During the years ended December 31, 2017, 2016 and 2015, the Company recorded employee share-based compensation expense from continuing operations of $3,758, $1,573 and $1,974, respectively. Total share-based compensation expense included in the consolidated statements of operations is as follows:

	Year Ended December 31,		
	2017	2016	2015
Research and development	$ 1,768	$ 477	$ 541
General and administrative	1,990	1,096	1,433
Discontinued operations	—	—	410
	$ 3,758	$ 1,573	$ 2,384

The fair value of each option grant is estimated on the grant date using the Black-Scholes option-pricing model, using the following weighted average assumptions:

	Year Ended December 31,		
	2017	2016	2015
Estimated dividend yield	0.00%	0.00%	0.00%
Expected volatility	82.16%	75.08%	65.96-102.77%
Risk-free interest rate	1.81%	1.32%	1.48-1.81%
Expected life of options (in years)	5.04	5.72	5.1-5.9
Weighted-average fair value per share	$ 3.31	$ 11.47	$ 6.83

Stock option activity for the periods indicated is as follows:

	Shares Available for Grant	Shares Subject to Outstanding Options	Weighted-Average Exercise Price Per Share	Weighted-Average Remaining Contractual Term (in years)	Aggregate Intrinsic Value
Options outstanding as of December 31, 2014	301,971	336,513	$ 0.91		
Additional shares reserved under plan	416,666	—			
Options granted	(366,909)	366,909	8.80		
Options forfeited	54,165	(54,165)	3.70		
Options exercised	—	(191,023)	2.45		
Options outstanding as of December 31, 2015	405,893	458,234	$ 6.26		
Additional shares reserved under plan	611,272	—			
Options granted	(405,624)	405,624	16.06		
Options forfeited	3,666	(7,395)	6.62		
Options exercised	—	(31,333)	1.11		
Options outstanding as of December 31, 2016	615,207	825,130	$ 11.27		
Additional shares reserved under plan	1,200,000	—			
Options granted	(926,195)	926,195	5.15		
Options forfeited	134,366	(286,425)	13.81		
Options exercised	—	(65,416)	1.25		
Options outstanding as of December 31, 2017	1,023,378	1,399,484	$ 7.17	8.80	$ 399
Vested and expected to vest as of December 31, 2015		430,730	$ 6.16	8.80	$ 5,102
Exercisable as of December 31, 2015		232,827	$ 4.27	8.38	$ 3,196
Vested and expected to vest as of December 31, 2016		766,402	$ 10.95	8.49	$ 12,314
Exercisable as of December 31, 2016		303,162	$ 7.32	7.53	$ 5,974
Vested and expected to vest as of December 31, 2017		1,319,798	$ 7.23	8.77	$ 390
Exercisable as of December 31, 2017		678,480	$ 7.76	8.24	$ 366

The total intrinsic value of options exercised during the years ended December 31, 2017, 2016 and 2015 was $901, $543 and $1,655, respectively.

As of December 31, 2017 and 2016, total unrecognized compensation expense related to non-vested share based compensation arrangements was $2,343 and $4,896, respectively, which is expected to be recognized over a weighted average period of 1.43 and 1.99 years, respectively.

Note 9: Income Taxes

There was no income tax benefit recognized for the years ended December 31, 2017, 2016 and 2015 due to the Company's history of net losses combined with an inability to confirm recovery of the tax benefits from the Company's losses and other net deferred tax assets. The Company has established a valuation allowance against its deferred tax assets due to the uncertainty surrounding the realization of such assets.

The reasons for the difference between actual income tax benefit for the years ended December 31, 2017, 2016 and 2015, and the amount computed by applying the statutory federal income tax rate to losses before income tax benefit are as follows:

	Year Ended December 31,		
	2017	2016	2015
Income tax benefit at federal statutory rate	$ (12,623)	$ (20,298)	$ (9,540)
State income taxes, net of federal benefit	(762)	(1,204)	(741)
Non-deductible expenses	235	229	608
Federal rate impact	18,960	—	—
Distribution of intellectual property rights	—	—	657
Research and development tax credits	(1,732)	(1,692)	(767)
Other	431	(124)	283
Change in valuation allowance	(4,509)	23,089	9,500
Total income tax provision	$ —	$ —	$ —

Deferred income taxes reflect the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. Significant components of the Company's deferred tax assets and deferred tax liabilities are as follows:

	As of December 31,	
	2017	2016
Deferred tax assets:		
Accrued compensation	$ 329	$ 618
Accrued liabilities	121	700
Tax loss carryforwards	32,395	37,857
Intangible assets	307	401
Share-based compensation	728	412
Tax credits	5,662	3,930
Facility financing lease obligation	1,861	2,881
Other	13	33
Total deferred tax assets	41,416	46,832
Less valuation allowance	(39,291)	(43,800)
Net deferred tax asset	2,125	3,032
Deferred tax liabilities:		
Fixed assets	(2,067)	(3,032)
Other	(58)	—
Net noncurrent deferred tax asset (liability)	$ —	$ —

In December 2017, the Tax Cuts and Jobs Act, or TCJA, was signed into law. Among other things, the TCJA permanently lowers the corporate federal income tax rate to 21% from the existing maximum rate of 35%, effective for tax years including or commencing January 1, 2018. Based on provisions of the TCJA, the Company remeasured its deferred tax assets and liabilities to reflect the lower statutory tax rate, which resulted in a provision of $18,960 to income tax expense. However, there is no impact to our effective tax rate because a corresponding and offsetting reduction was made in the valuation allowance. The other provisions of the TCJA did not have a material impact on the consolidated financial statements. The Company's deferred tax remeasurement is complete and all tax effects of the TJCA have been reflected in the Company's income tax provision for the year ended December 31, 2017.

As of December 31, 2017, the Company had federal and state net operating loss carryforwards of $140,508 and $142,388, respectively. The net operating loss carryforwards begin to expire in 2028 and 2023 for federal and state tax purposes, respectively. As of December 31, 2017, the Company had charitable contribution carryforwards of approximately $63 available to offset future federal taxable income which will begin to expire in 2018. As of December 31, 2017, the Company had government research and development tax credits of approximately $5,662 to offset future federal taxes which begin to expire in 2028.

The Company had no unrecognized tax benefits as of December 31, 2017 and 2016. The Company does not anticipate a significant change in total unrecognized tax benefits within the next 12 months.

The Tax Reform Act of 1986 contains provisions which limit the ability to utilize the net operating loss carryforwards in the case of certain events including significant changes in ownership interests. If the Company's net operating loss carryforwards are limited, and the Company has taxable income which exceeds the permissible yearly net operating loss carryforwards, the Company would incur a federal income tax liability even though net operating loss carryforwards would be available in future years.

Note 10: Retirement Plan

The Company maintains a defined contribution savings plan under Section 401(k) of the Internal Revenue Code. This plan covers all employees who meet minimum age requirements and allows participants to defer a portion of their annual compensation on a pre-tax basis. The Company has made discretionary matching contributions, up to 3% of gross wages, during 2017 and 2016 and up to 2% of gross wages during 2015. The Company contributed $201, $170 and $100, for the years ended December 31, 2017, 2016 and 2015, respectively.

Note 11: Related Party Transactions

During the year ended December 31, 2015, the Company paid a former director $88 in conjunction with a research and development consulting agreement. No such payments were made during the years ended December 31, 2017 and 2016. These costs were expensed as incurred and are classified as research and development expenses in the consolidated statements of operations.

Members of the Company's board of directors held 2,486,656 shares of convertible preferred stock as of December 31, 2015. As discussed in Note 1—Organization and Significant Accounting Policies, all convertible preferred stock was converted into common stock in conjunction with the IPO in September 2016. As a result, Board members held zero preferred shares as of December 31, 2017 and 2016. Board members held 1,585,916, 1,561,916 and 1,761,416 shares of the Company's common stock as of December 31, 2017, 2016 and 2015, respectively. See Note 7—Stockholders' Equity regarding a repurchase of common stock from a related party officer and director of the Company.

In June 2017, G. Kelly Martin assumed the role of the Company's Chief Executive Officer on an interim basis. Mr. Martin also continues to serve as a member of the Company's board of directors. Until October 1, 2017, Mr. Martin served as chief executive officer of Malin Corporation plc, the parent company of Malin, a greater than 10% shareholder of the Company as of December 31, 2017. Mr. Martin has not received any additional compensation for his service as the Company's Chief Executive Officer during the year ended December 31, 2017. Mr. Martin has continued to be compensated pursuant to the Company's non-employee director compensation policy.

Upon stepping into the Company's Chief Executive Officer role on an interim basis, Mr. Martin engaged a number of Malin employees to assist him in certain strategic and tactical initiatives and activities. The Company has agreed to reimburse Malin for its out-of-pocket expenses for Mr. Martin and other Malin employees related to this effort. During the year ended December 31, 2017, the Company recognized $230 in out-of-pocket travel expenses owed to Malin which are classified as general and administrative expense in the accompanying consolidated statements of operations. These expenses were included in other accrued expenses as of December 31, 2017 and were reimbursed in the first quarter of 2018.

Two of the Company's directors are also affiliated with Malin, including Sean Murphy, an executive officer and a director of Malin and an executive vice president of Malin Corporation plc, and Robert A. Ingram, a director of Malin Corporation plc.

During the year ended December 31, 2017, the Company incurred costs of $69 in relation to a development and manufacturing consulting agreement with Cilatus BioPharma AG, which is majority-owned by Malin Corporation plc. These costs were expensed as incurred and are classified as research and development expenses in the

accompanying consolidated statements of operations. See Note 13—Subsequent Events for additional contractual obligations that became effective subsequent to December 31, 2017.

See Note 1—Organization and Significant Accounting Policies and Note 4—Collaboration Arrangements for additional information regarding related party transactions with KNOW Bio.

Note 12: Quarterly Results of Operations (Unaudited)

The following table contains quarterly financial information for 2017 and 2016. The Company believes that the following information reflects all normal recurring adjustments necessary for a fair statement of the information for the periods presented. The operating results for any quarter are not necessarily indicative of results for any future period.

	Three Months Ended (unaudited)			
	March 31, 2017	June 30, 2017	September 30, 2017	December 31, 2017
Total revenue	$ 100	$ 669	$ 750	$ 621
Total operating expenses	11,477	10,323	7,955	8,570
Operating loss	(11,377)	(9,654)	(7,205)	(7,949)
Other (expense) income, net	(230)	(233)	(239)	(240)
Net loss and comprehensive loss	$ (11,607)	$ (9,887)	$ (7,444)	$ (8,189)
Net loss per share, basic and diluted	$ (0.73)	$ (0.62)	$ (0.47)	$ (0.51)
Weighted-average common shares outstanding, basic and diluted	15,967,882	15,975,108	15,984,428	15,997,241

	March 31, 2016	June 30, 2016	September 30, 2016	December 31, 2016
Total operating expenses	$ 11,272	$ 17,935	$ 17,481	$ 13,138
Operating loss	(11,272)	(17,935)	(17,481)	(13,138)
Other (expense) income, net	12	31	7	77
Net loss and comprehensive loss	$ (11,260)	$ (17,904)	$ (17,474)	$ (13,061)
Net loss per share, basic and diluted	$ (4.60)	$ (7.31)	$ (5.76)	$ (0.82)
Weighted-average common shares outstanding, basic and diluted	2,445,351	2,448,747	3,033,967	15,938,941

Note 13: Subsequent Events

January 2018 Offering

On January 9, 2018, the Company completed a public offering of its common stock and warrants pursuant to the Company's effective Shelf Registration. The Company sold an aggregate of 10,000,000 shares of common stock and warrants to purchase up to 10,000,000 shares of the Company's common stock at a public offering price of $3.80 per share of common stock and accompanying warrant. The warrant exercise price is $4.66 per share and will expire four years from the date of issuance. Net proceeds from the offering were approximately $35,200 after deducting underwriting discounts and commissions and estimated offering expenses of approximately $2,800.

Statements of Work with Cilatus BioPharma AG

During the first quarter of 2018, the Company entered into additional statements of work with Cilatus BioPharma AG, an affiliate of Malin and related party of the Company, to perform research and development consulting services. The statements of work include aggregate estimated fees of $418, which are expected to be incurred throughout 2018.

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

None.

Item 9A. Controls and Procedures.

Disclosure Controls and Procedures

We maintain disclosure controls and procedures that are designed to ensure that information required to be disclosed in the reports that we file or submit under the Securities Exchange Act of 1934 is (i) recorded, processed, summarized, and reported within the time periods specified in the SEC's rules and forms and (ii) accumulated and communicated to our management, including our principal executive officer and principal financial officer, to allow timely decisions regarding required disclosure.

As of December 31, 2017, our management, with the participation of our principal executive officer and principal financial officer, evaluated the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934). Our management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives, and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Our principal executive officer and principal financial officer have concluded based upon the evaluation described above that, as of December 31, 2017, our disclosure controls and procedures were effective at the reasonable assurance level.

Management's Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as defined in the Exchange Act Rule 13a-15(f). Our internal control over financial reporting is designed to provide reasonable assurance to our management and board of directors regarding the preparation and fair presentation of published financial statements. A control system, no matter how well designed and operated, can only provide reasonable, not absolute, assurance that the objectives of the control system are met. Because of these inherent limitations, management does not expect that our internal controls over financial reporting will prevent all error and all fraud. Management conducted an evaluation of our internal control over financial reporting based on the framework in Internal Control—Integrated Framework issued in 2013 by the Committee of Sponsoring Organizations of the Treadway Commission (the "2013 Framework"). Based on our evaluation under the 2013 Framework, management concluded that our internal control over financial reporting was effective as of December 31, 2017.

This Annual Report on Form 10-K does not include an attestation report of our independent registered public accounting firm regarding internal control over financial reporting due to a transition period established by the rules of the SEC for newly public companies. We are an "emerging growth company" as defined in the JOBS Act. For as long as we remain an "emerging growth company," we are exempt from the auditor attestation requirement in the assessment of the effectiveness of our internal control over financial reporting.

Changes in Internal Control over Financial Reporting

There were no changes in the Company's internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) of the Exchange Act) during the last quarter that have materially affected, or are reasonably likely to materially affect, the Company's internal control over financial reporting.

Item 9B. Other Information.

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

The information required by this item is incorporated herein by reference from our Proxy Statement, which will be filed with the SEC within 120 days after the end of our 2017 fiscal year pursuant to Regulation 14A for our 2018 Annual Meeting of Stockholders (the "Proxy Statement"), under the captions "Executive Officers of the Company," "Proposal 1—Election of Directors," "Section 16 Beneficial Ownership Reporting Compliance."

We have adopted a code of business conduct and ethics that applies to our directors, officers (including our principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions) and other employees. A copy of our Code of Business Conduct and Ethics is available on our website at www.novan.com under "Investors & Media—Corporate Governance." We intend to post on our website and (if required) file on Form 8-K all disclosures that are required by applicable law, the rules of the SEC, or the Nasdaq listing standards, concerning any amendment to, or waiver from, our Code of Business Conduct and Ethics.

Item 11. Executive Compensation.

The information required by this item is incorporated herein by reference from the Proxy Statement under the captions "Executive Compensation and Related Information."

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

The information required by this item is incorporated herein by reference from the Proxy Statement, under the captions "Security Ownership of Certain Beneficial Owners and Management" and "Equity Compensation Plan Information."

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

The information required by this item is incorporated herein by reference from the Proxy Statement, under the captions "Corporate Governance" and "Certain Relationships and Related Party Transactions."

Item 14. Principal Accounting Fees and Services.

The information required by this item will be set forth in our Proxy Statement under the caption "Principal Accountant Fees and Services."

PART IV

Item 15. Exhibits, Financial Statement Schedules.

(a) The following financial statements are included in this Annual Report on Form 10-K:

(1) List of Financial Statements:

The financial statements required by this item are listed in Item 8, "Financial Statements and Supplementary Data" herein.

(2) List of Financial Statement Schedules:

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

(3) List of Exhibits.

EXHIBIT NO.	DESCRIPTION	FILED HEREWITH	INCORPORATED BY REFERENCE			
			FORM	FILE NO.	EXHIBIT	FILING DATE
3.1	Restated Certificate of Incorporation of Novan, Inc., effective September 26, 2016.		8-K	001-37880	3.1	September 27, 2016
3.2	Amended and Restated Bylaws of Novan, Inc., effective September 26, 2016.		8-K	001-37880	3.2	September 27, 2016
10.1	# Form of Director and Executive Officer Indemnification Agreement.		S-1	333-213276	10.1	August 24, 2016
10.2	# 2008 Stock Plan, as amended, and form of option agreements thereunder.		S-1	333-213276	10.2	August 24, 2016
10.3	# 2016 Incentive Award Plan, as amended.		S-8	333-219913	99.1	August 11, 2017
10.4	# Senior Executive Annual Incentive Plan.		10-K	001-37880	10.4	March 20, 2017
10.5	# Form of Award Agreement Awarding Non-Qualified Stock Options to Employees under the Novan, Inc. 2016 Incentive Award Plan.		10-Q	001-37880	10.1	November 14, 2016
10.6	# Form of Award Agreement Awarding Incentive Stock Options to Employees under the Novan, Inc. 2016 Incentive Award Plan.		10-Q	001-37880	10.2	November 14, 2016
10.7	# Form of Award Agreement Awarding Non-Qualified Stock Options to Non-Employee Directors under the Novan, Inc. 2016 Incentive Award Plan.		10-Q	001-37880	10.3	November 14, 2016
10.8	# Amended and Restated Employment Agreement, dated April 13, 2016, by and between Novan, Inc. and Nathan Stasko.		S-1	333-213276	10.4	August 24, 2016
10.9	# First Amendment to Amended and Restated Employment Agreement, dated June 4, 2017, by and between Novan, Inc. and Nathan Stasko.		8-K	001-37880	10.1	June 5, 2017
10.10	# Employment Agreement, dated April 13, 2016, by and between Novan, Inc. and Richard Peterson.		S-1	333-213276	10.5	August 24, 2016

EXHIBIT NO.	DESCRIPTION	FILED HEREWITH	INCORPORATED BY REFERENCE			
			FORM	FILE NO.	EXHIBIT	FILING DATE
10.11	# Separation and General Release Agreement, dated March 24, 2017, by and between Novan, Inc. and Richard Peterson.		10-Q	001-37880	10.3	May 12, 2017
10.12	# Offer Letter, dated March 21, 2017, by and between Novan, Inc. and William B. Hodges		8-K	001-37880	10.1	March 22, 2017
10.13	# Letter Agreement, dated October 31, 2017, by and between Novan, Inc. and William B. Hodges		8-K	001-37880	10.1	November 6, 2017
10.14	# Employment Agreement, dated August 25, 2016, by and between Novan, Inc. and M. Joyce Rico.		10-K	001-37880	10.11	March 20, 2017
10.15	# Separation and General Release Agreement, dated May 6, 2017, by and between Novan, Inc. and M. Joyce Rico.		10-Q	001-37880	10.5	May 12, 2017
10.16	# Employment Agreement, dated March 16, 2017, by and between Novan, Inc. and Paula Brown Stafford, as amended October 12, 2017 and March 14, 2018.	X				
10.17	# Non-employee Director Compensation Policy	X				
10.18	† Amended, Restated and Consolidated License Agreement between The University of North Carolina and Novan, Inc., dated as of June 27, 2012, and as amended on November 30, 2012.		S-1/A	333-213276	10,7	September 8, 2016
10.19	† Second Amendment, dated April 12, 2016, to the Amended, Restated and Consolidated License Agreement between The University of North Carolina and Novan, Inc., dated as of June 27, 2012.		10-Q	001-37880	10.4	November 14, 2016
10.20	† UNC Sublicense Agreement, dated December 29, 2015, by and between Novan, Inc. and KNOW Bio, LLC.		S-1	333-213276	10.8	August 24, 2016

EXHIBIT NO.	DESCRIPTION	FILED HEREWITH	INCORPORATED BY REFERENCE			
			FORM	FILE NO.	EXHIBIT	FILING DATE
10.21	† First Amendment, dated October 13, 2017, to the UNC Sublicense Agreement, dated December 29, 2015, by and between Novan, Inc. and KNOW Bio, LLC.	X				
10.22	† Novan Patent and Know-How License Agreement, dated December 29, 2015, by and between Novan, Inc. and KNOW Bio, LLC.		S-1	333-213276	10.9	August 24, 2016
10.23	† First Amendment, dated October 13, 2017, to the Novan Patent and Know-How License Agreement, dated December 29, 2015, by and between Novan, Inc. and KNOW Bio, LLC.	X				
10.24	† License Agreement, dated January 12, 2017, by and between Novan, Inc. and Sato Pharmaceutical Co. Ltd.		10-K	001-37880	10.17	March 20, 2017
10.25	† First Amendment, dated January 12, 2017 to the License Agreement, dated January 12, 2017, by and between Novan, Inc. and Sato Pharmaceutical Co. Ltd.		10-K	001-37880	10.18	March 20, 2017
10.26	Lease, dated as of August 17, 2015, by and between Novan, Inc. and Durham Hopson Road, LLC, as amended on January 6, 2015.		S-1	333-213276	10.11	August 24, 2016
10.27	Second Amendment, dated as of September 12, 2016, to the Lease, dated as of August 17, 2015, by and between Novan, Inc. and Durham Hopson Road, LLC.		10-Q	001-37880	10.7	November 14, 2016
10.28	Stock Sale and Purchase Agreement, dated April 13, 2016, by and between Novan, Inc. and Stasko Living Trust.		S-1	333-213276	10.12	August 24, 2016
23.1	Consent of PricewaterhouseCoopers LLP.	X				

EXHIBIT NO.	DESCRIPTION	FILED HEREWITH	INCORPORATED BY REFERENCE			
			FORM	FILE NO.	EXHIBIT	FILING DATE
31.1	Certification of Chief Executive Officer pursuant to Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.	X				
31.2	Certification of Chief Financial Officer pursuant to Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.	X				
32.1	Certification of Chief Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.	X				
32.2	Certification of Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.	X				
101.INS	XBRL Instance Document.	X				
101.SCH	XBRL Taxonomy Extension Schema Document.	X				
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document.	X				
101.DEF	XBRL Taxonomy Extension Definition Document.	X				
101.LAB	XBRL Taxonomy Extension Label Linkbase Document.	X				
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document.	X				

Item 16. Form 10-K Summary.

None.

SIGNATURES

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

Novan, Inc.

Date: March 27, 2018

By: /s/ G. Kelly Martin
G. Kelly Martin
Interim Chief Executive Officer
(Principal Executive Officer)

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

Name	Title	Date
/s/ G. Kelly Martin **G. Kelly Martin**	Interim Chief Executive Officer and Director (Principal Executive Officer)	March 27, 2018
/s/ Jeff N. Hunter **Jeff N. Hunter**	Interim Chief Financial Officer (Principal Financial and Accounting Officer)	March 27, 2018
/s/ Robert A. Ingram **Robert A. Ingram**	Chairman of the Board	March 27, 2018
/s/ W. Kent Geer **W. Kent Geer**	Director	March 27, 2018
/s/ Robert J. Keegan **Robert J. Keegan**	Director	March 27, 2018
/s/ Sean Murphy **Sean Murphy**	Director	March 27, 2018
/s/ John Palmour **John Palmour**	Director	March 27, 2018
/s/ Machelle Sanders **Machelle Sanders**	Director	March 27, 2018
/s/ Paula Brown Stafford **Paula Brown Stafford**	Director	March 27, 2018
/s/ Nathan Stasko **Nathan Stasko**	Director	March 27, 2018
/s/ Eugene Sun **Eugene Sun**	Director	March 27, 2018

Board of Directors

Robert A. Ingram – *Chairman*
W. Kent Geer
Robert J. Keegan
Sean Murphy
G. Kelly Martin
John Palmour
Machelle Sanders
Paula Brown Stafford
Nathan Stasko
Eugene Sun

Senior Leadership

G. Kelly Martin – *Chief Executive Officer*
Nathan Stasko – *President, Chief Scientific Officer*
Kevin Barber – *Vice President of Regulatory Affairs*
Carri Geer – *Vice President of Pharmaceutical Development*
Jeff N. Hunter – *EVP, Chief Business Officer, Corporate Secretary*
Tomoko Maeda-Chubachi – *Vice President of Medical Dermatology*
Andrew Novak – *Vice President, Chief Accounting Officer*
Tim O'Sullivan – *Vice President of Intellectual Property*
Paula Brown Stafford – *Chief Development Officer*

Corporate Information

Headquarters:

4105 Hopson Road
Morrisville, North Carolina 27560
T: (919) 485-8080
F: (919) 237-9212
www.novan.com

Stock Exchange:

NASDAQ
NOVN symbol

Transfer Agent:

American Stock Transfer & Trust Company, LLC
www.amstock.com

Independent Registered Public Accounting Firm:

Pricewaterhouse Coopers LLP
4208 Six Forks Road
Suite 1200
Raleigh NC, 27609

Investor Relations:

investors@novan.com

Information Request:

Copies of the Company's Annual Report on Form 10-k and other investor information are available to stockholders upon written request to:
Novan, Inc., Attention Investor Relations.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