

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

FORM 10-K

(Mark One)

ANNUAL REPORT UNDER SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934.

For the Fiscal Year Ended **December 31, 2019**

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934.

For the transition period from _____ to _____

Commission File No. 000-16929

SOLIGENIX, INC.

(Exact name of registrant as specified in its charter)

Delaware

41-1505029

(State or other jurisdiction of
incorporation or organization)

(I.R.S. Employer
Identification Number)

**29 EMMONS DRIVE, SUITE B-10
PRINCETON, NJ**

08540

(Address of principal executive offices)

(Zip Code)

(609) 538-8200

(Registrant's telephone number, including area code)

Securities registered under Section 12 (b) of the Exchange Act:

Title of each class	Trading Symbol (s)	Name of each exchange on which registered
Common Stock, par value \$0.01 per share	SNGX	The Nasdaq Capital Market
Common Stock Purchase Warrants	SNGXW	The Nasdaq Capital Market

Securities registered under Section 12(g) of the Exchange 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 Section 15(d) of the Act. Yes No

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

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

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definition of "large accelerated filer", "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act. (Check one):

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

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

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

The aggregate market value of the common stock held by non-affiliates of the registrant was approximately \$9,584,222 (assuming, for this purpose, that executive officers, directors and holders of 10% or more of the common stock are affiliates), based on the closing price of the registrant's common stock as reported on The Nasdaq Capital Market on June 28, 2019.

On March 23, 2020 25,778,431 shares of the registrant's common stock, were outstanding.

DOCUMENTS INCORPORATED BY REFERENCE: None.

SOLIGENIX, INC.

ANNUAL REPORT ON FORM 10-K
For the Year Ended December 31, 2019

Table of Contents

Item	Description	Page
	Cautionary Note Regarding Forward-Looking Statements	ii
	Part I	
1.	Business	1
1A.	Risk Factors	24
1B.	Unresolved Staff Comments	41
2.	Properties	41
3.	Legal Proceedings	41
	Part II	
5.	Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities	42
6.	Selected Financial Data	42
7.	Management's Discussion and Analysis of Financial Condition and Results of Operations	43
8.	Financial Statements and Supplementary Data	50
9.	Changes in and Disagreements with Accountants on Accounting and Financial Disclosure	50
9A.	Controls and Procedures	50
9B.	Other Information	51
	Part III	
10.	Directors, Executive Officers and Corporate Governance	52
11.	Executive Compensation	57
12.	Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters	62
13.	Certain Relationships and Related Transactions and Director Independence	64
14.	Principal Accountant Fees and Services	65
	Part IV	
15.	Exhibits and Financial Statement Schedules	66
	Signatures	69
	Consolidated Financial Statements	F-1

CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains forward-looking statements, within the meaning of the Private Securities Litigation Reform Act of 1995, that reflect our current expectations about our future results, performance, prospects and opportunities. These forward-looking statements are not guarantees of future performance and are subject to significant risks, uncertainties, assumptions and other factors, which are difficult to predict and may cause actual results to differ materially from those expressed in, or implied by, any forward-looking statements. The forward-looking statements within this report may be identified by words such as “believes,” “anticipates,” “expects,” “intends,” “may,” “would,” “will” and other similar expressions. However, these words are not the exclusive means of identifying these statements. Statements that are not historical facts are based on our current expectations, beliefs, assumptions, estimates, forecasts and projections for our business and the industry and markets related to our business and are forward-looking statements.

Actual outcomes and results may differ materially from what is expressed in such forward-looking statements. Important factors which may affect these actual outcomes and results include, without limitation:

- uncertainty as to whether our product candidates will be sufficiently safe and effective to support regulatory approvals;
- uncertainty inherent in developing vaccines, and manufacturing and conducting preclinical and clinical trials of vaccines;
- our ability to obtain future financing or funds when needed, either through the raising of capital, the incurrence of convertible or other indebtedness or through strategic financing or commercialization partnerships;
- that product development and commercialization efforts will be reduced or discontinued due to difficulties or delays in clinical trials or a lack of progress or positive results from research and development efforts;
- maintenance and progression of our business strategy;
- the possibility that our products under development may not gain market acceptance;
- our expectations about the potential market sizes and market participation potential for our product candidates may not be realized;
- our expected revenues (including sales, milestone payments and royalty revenues) from our product candidates and any related commercial agreements of ours may not be realized;
- the ability of our manufacturing partners to supply us or our commercial partners with clinical or commercial supplies of our products in a safe, timely and regulatory compliant manner and the ability of such partners to timely address any regulatory issues that have arisen or may in the future arise; and
- competition existing today or that may arise in the future, including the possibility that others may develop technologies or products superior to our products;
- the effect that global pathogens could have on financial markets, materials sourcing, patients, governments and population (e.g. COVID-19); and
- other factors, including those “Risk Factors” set forth under Part I, Item 1A. “Risk Factors” in this Annual Report.

Except as expressly required by the federal securities laws, we undertake no obligation to publicly update or revise any forward-looking statements to reflect events or circumstances occurring subsequent to the filing of this Form 10-K with the U.S. Securities and Exchange Commission (“the SEC”) or for any other reason. You should carefully review and consider the various disclosures we make in this report and our other reports filed with the SEC that attempt to advise interested parties of the risks, uncertainties and other factors that may affect our business.

PART I

Item 1. Business

This Annual Report on Form 10-K contains statements of a forward-looking nature relating to future events or our future financial performance. These statements are only predictions and actual events or results may differ materially. In evaluating such statements, you should carefully consider the various factors identified in this report that could cause actual results to differ materially from those indicated in any forward-looking statements, including those set forth in “Risk Factors” in this Annual Report on Form 10-K. See “Cautionary Note Regarding Forward Looking Statements.”

Our Business Overview

We are a late-stage biopharmaceutical company focused on developing and commercializing products to treat rare diseases where there is an unmet medical need. We maintain two active business segments: Specialized BioTherapeutics (formerly “BioTherapeutics”) and Public Health Solutions (formerly “Vaccines/BioDefense”).

Our Specialized BioTherapeutics business segment is developing a novel photodynamic therapy (SGX301) utilizing topical synthetic hypericin activated with safe visible fluorescent light for the treatment of cutaneous T-cell lymphoma (“CTCL”), our first-in-class innate defense regulator technology, dusquetide (SGX942) for the treatment of oral mucositis in head and neck cancer, and proprietary formulations of oral beclomethasone 17,21-dipropionate (“BDP”) for the prevention/treatment of gastrointestinal (“GI”) disorders characterized by severe inflammation, including pediatric Crohn’s disease (SGX203) and acute radiation enteritis (SGX201).

Our Public Health Solutions business segment includes active development programs for RiVax[®], our ricin toxin vaccine candidate and SGX943, our therapeutic candidate for antibiotic resistant and emerging infectious disease. The development of our vaccine programs currently is supported by our heat stabilization technology, known as ThermoVax[®], under existing and on-going government contract funding. With the government contract from the National Institute of Allergy and Infectious Diseases (“NIAID”), we will attempt to advance the development of RiVax[®] to protect against exposure to ricin toxin.

An outline of our business strategy follows:

- Following positive primary endpoint topline analysis for the Phase 3 clinical trial of SGX301, continue to explore partnership and commercialization while pursuing New Drug Application (“NDA”) filing;
- Following positive interim analysis, complete enrollment and report final results in our pivotal Phase 3 clinical trial of SGX942 for the treatment of oral mucositis in head and neck cancer;
- Continue development of RiVax[®] in combination with our ThermoVax[®] technology to develop a new heat stable vaccine in biodefense with NIAID funding support;
- Continue to apply for and secure additional government funding for each of our Specialized BioTherapeutics and Public Health Solutions programs through grants, contracts and/or procurements;
- Pursue business development opportunities for our pipeline programs, as well as explore merger/acquisition strategies; and
- Acquire or in-license new clinical-stage compounds for development.

Corporate Information

We were incorporated in Delaware in 1987 under the name Biological Therapeutics, Inc. In 1987, we merged with Biological Therapeutics, Inc., a North Dakota corporation, pursuant to which we changed our name to “Immunotherapeutics, Inc.” We changed our name to “Endorex Corp.” in 1996, to “Endorex Corporation” in 1998, to “DOR BioPharma, Inc.” in 2001, and finally to “Soligenix, Inc.” in 2009. Our principal executive offices are located at 29 Emmons Drive, Suite B-10, Princeton, New Jersey 08540 and our telephone number is (609) 538-8200.

Our Product Candidates in Development

The following tables summarize our product candidates under development:

Specialized BioTherapeutics Product Candidates*

<u>Soligenix Product Candidate</u>	<u>Therapeutic Indication</u>	<u>Stage of Development</u>
SGX301	Cutaneous T-Cell Lymphoma	Phase 2 trial completed; demonstrated significantly higher response rate compared to placebo; Phase 3 completed; demonstrated statistical significance in primary endpoint in March 2020; extended treatment and follow-up outcomes pending throughout 2020
SGX942	Oral Mucositis in Head and Neck Cancer	Phase 2 trial completed; demonstrated significant response compared to placebo with positive long-term (12 month) safety also reported; Phase 3 clinical trial enrolled first patient in December 2017, with positive interim analysis received in August 2019; final results expected in the fourth quarter of 2020
SGX203†	Pediatric Crohn's disease	Phase 1/2 clinical trial completed; efficacy data, pharmacokinetic (PK)/pharmacodynamic (PD) profile and safety profile demonstrated; Phase 3 clinical trial initiation contingent upon additional funding, such as through partnership
SGX201†	Acute Radiation Enteritis	Phase 1/2 clinical trial completed; safety profile and preliminary efficacy demonstrated; further clinical development contingent upon additional funding, such as through partnership

Public Health Solutions*†

ThermoVax®	Thermostability of vaccines for Ricin toxin, Ebola, Marburg and SARS-CoV-2 (COVID-19) viruses	Pre-clinical
RiVax®	Vaccine against Ricin Toxin Poisoning	Phase 1a and 1b trials completed, safety and neutralizing antibodies for protection demonstrated; Phase 1c trial initiated December 2019, closed January 2020
SGX943	Therapeutic against Emerging Infectious Diseases	Pre-clinical

* Timelines subject to potential disruption due to COVID-19 outbreak.

† Contingent upon continued government contract/grant funding or other funding source.

Specialized BioTherapeutics Overview

SGX301 – for Treating Cutaneous T-Cell Lymphoma

SGX301 is a novel, first-in-class, photodynamic therapy that utilizes safe visible light for activation. The active ingredient in SGX301 is synthetic hypericin, a photosensitizer which is topically applied to skin lesions and then activated by fluorescent light 16 to 24 hours later. Hypericin is also found in several species of *Hypericum* plants, although the drug used in SGX301 is chemically synthesized by a proprietary manufacturing process and not extracted from plants. Importantly, hypericin is optimally activated with visible light thereby avoiding the negative consequences of ultraviolet light. Other light therapies using UVA or UVB light can result in serious adverse effects including secondary skin cancers.

Combined with photoactivation, in clinical trials synthetic hypericin has demonstrated significant anti-proliferative effects on activated normal human lymphoid cells and inhibited growth of malignant T-cells isolated from CTCL patients. In both settings, it appears that the mode of action is an induction of cell death in a concentration as well as a light dose-dependent fashion. These effects appear to result, in part, from the generation of singlet oxygen during photoactivation of hypericin.

Hypericin is one of the most efficient known generators of singlet oxygen, the key component for phototherapy. The generation of singlet oxygen induces necrosis and apoptosis in adjacent cells. The use of topical synthetic hypericin coupled with directed visible light results in generation of singlet oxygen only at the treated site. We believe that the use of visible light (as opposed to cancer-causing ultraviolet light) is a major advance in photodynamic therapy. In a published Phase 2 clinical study in CTCL, after six weeks of twice weekly therapy, a majority of patients experienced a statistically significant ($p \leq 0.04$) improvement with SGX301 whereas the placebo was ineffective: 58.3% compared to 8.3%, respectively.

SGX301 has received Orphan Drug designation as well as Fast Track designation from the United States (“U.S.”) Food and Drug Administration (“FDA”). The Orphan Drug Act is intended to assist and encourage companies to develop safe and effective therapies for the treatment of rare diseases and disorders. In addition to providing a seven-year term of market exclusivity for SGX301 upon final FDA approval, Orphan Drug designation also positions us to be able to leverage a wide range of financial and regulatory benefits, including government grants for conducting clinical trials, waiver of FDA user fees for the potential submission of a NDA for SGX301, and certain tax credits. In addition, Fast Track is a designation that the FDA reserves for a drug intended to treat a serious or life-threatening condition and one that demonstrates the potential to address an unmet medical need for the condition. Fast Track designation is designed to facilitate the development and expedite the review of new drugs. For instance, should events warrant, we will be eligible to submit a NDA for SGX301 on a rolling basis, permitting the FDA to review sections of the NDA prior to receiving the complete submission. Additionally, NDAs for Fast Track development programs ordinarily will be eligible for priority review. SGX301 for the treatment of CTCL also was granted Orphan Drug designation from the European Medicines Agency (“EMA”) Committee for Orphan Medical Products and Promising Innovative Medicine (“PIM”) designation from the Medicines and Healthcare Products Regulatory Agency (“MHRA”) in the United Kingdom (“UK”).

In August 2018, the U.S. Patent Office granted us a patent titled “Systems and Methods for Producing Synthetic Hypericin” for the unique proprietary process manufacturing the highly purified form of synthetic hypericin, the active pharmaceutical ingredient in SGX301.

In October 2019, U.S. Patent Office had allowed the divisional patent application titled “Systems and Methods for Producing Synthetic Hypericin”. The allowed claims are directed to unique, proprietary methods to produce a novel, highly purified form of synthetic hypericin. This new divisional claim set expands on the previous issued claims in the parent U.S. patent.

Based on the positive and previously published Phase 2 results, we initiated our pivotal Phase 3 clinical study of SGX301 for the treatment of CTCL during December 2015. This trial, referred to as the “FLASH” study (Fluorescent Light Activated Synthetic Hypericin), aims to evaluate the response to SGX301 as a skin directed therapy to treat early stage CTCL. We have completed patient enrollment with approximately 35 CTCL centers across the U.S. participating in this pivotal trial. The Phase 3 protocol is a highly powered, double-blind, randomized, placebo-controlled, multicenter trial that enrolled 169 subjects (166 evaluable). The trial consists of three treatment cycles, each of eight weeks duration. Treatments are administered twice weekly for the first six weeks and treatment response is determined at the end of the eighth week. In the first treatment cycle, approximately 66% of subjects receive SGX301 and 33% receive placebo treatment of their index lesions. In the second cycle, all subjects receive SGX301 treatment of their index lesions, and in the third cycle, all subjects receive SGX301 treatment of all of their lesions. The majority of subjects enrolled to date have elected to continue into the third optional, open-label cycle of the study. We continue to work closely with the Cutaneous Lymphoma Foundation, as well as the National Organization for Rare Disorders. Subjects are followed for an additional six months after their last evaluation visit. The primary efficacy endpoint is assessed on the percentage of patients in each of the two treatment groups (i.e., SGX301 and placebo) achieving a partial or complete response of the treated lesions, defined as a $\geq 50\%$ reduction in the total Composite Assessment of Index Lesion Disease Severity (“CAILS”) score for three index lesions at the Cycle 1 evaluation visit (Week 8) compared to the total CAILS score at baseline. Other secondary measures assess treatment response including duration, degree of improvement, time to relapse and safety.

During September 2017, the National Cancer Institute (“NCI”), part of the National Institutes of Health (“NIH”) awarded us a Small Business Innovation Research (“SBIR”) grant of approximately \$1.5 million over two years to support the conduct of our pivotal, Phase 3, randomized, double-blind, placebo-controlled study evaluating SGX301 (synthetic hypericin) as a treatment for CTCL.

During October 2018, an Independent Data Monitoring Committee (“DMC”) completed an unblinded interim analysis with data from approximately 100 subjects, including an assessment of the Phase 3 FLASH study’s primary efficacy endpoint. The DMC provided a positive recommendation to randomize approximately 40 additional subjects into the trial to maintain the rigorous assumption of 90% statistical power for the primary efficacy endpoint. No safety concerns were reported by the DMC based on the interim analysis.

Positive primary endpoint analysis for the Phase 3 study for SGX301 was completed in March 2020. The study enrolled 169 patients (166 evaluable) randomized 2:1 to receive either SGX301 (116 patients) or placebo (50 patients) and demonstrated a statistically significant treatment response ($p=0.04$) in the CAILS primary endpoint assessment at 8 weeks for Cycle 1. A total of 16% of the patients receiving SGX301 achieved at least a 50% reduction in their index lesions compared to only 4% of patients in the placebo group at 8 weeks. SGX301 treatment in the first cycle was safe and well tolerated. In the second open-label treatment cycle (Cycle 2), all patients received SGX301 treatment and preliminary results from blinded data to date suggest more than a 35% response rate (inclusive of patients receiving both 12 weeks and 6 weeks of therapy), indicating the response increases with continued treatment. Final results from Cycle 2 are expected to be announced in June 2020.

We estimate the potential worldwide market for SGX301 is in excess of \$250 million for all applications, including the treatment of CTCL. This potential market information is a forward-looking statement, and investors are urged not to place undue reliance on this statement. While we have determined this potential market size based on assumptions that we believe are reasonable, there are a number of factors that could cause our expectations to change or not be realized.

Cutaneous T-Cell Lymphoma

CTCL is a class of non-Hodgkin’s lymphoma (“NHL”), a type of cancer of the white blood cells that are an integral part of the immune system. Unlike most NHLs, which generally involve B-cell lymphocytes (involved in producing antibodies), CTCL is caused by an expansion of malignant T-cell lymphocytes (involved in cell-mediated immunity) normally programmed to migrate to the skin. These skin-trafficking malignant T-cells migrate to the skin, causing various lesions to appear that may change shape as the disease progresses, typically beginning as a rash and eventually forming plaques and tumors. Mycosis fungoides (“MF”) is the most common form of CTCL. It generally presents with skin involvement only, manifested as scaly, erythematous patches. Advanced disease with diffuse lymph node and visceral organ involvement is usually associated with a poorer response rate to standard therapies. A relatively uncommon sub-group of CTCL patients present with extensive skin involvement and circulating malignant cerebriform T-cells, referred to as Sézary syndrome. These patients have substantially graver prognoses (expected five-year survival rate of 24%), than those with MF (expected five-year survival rate of 88%).

CTCL mortality is related to stage of disease, with median survival generally ranging from about 12 years in the early stages to only 2.5 years when the disease has advanced. There is currently no FDA-approved drug for front-line treatment of early stage CTCL. Treatment of early-stage disease generally involves skin-directed therapies. One of the most common unapproved therapies used for early-stage disease is oral 5 or 8-methoxypsoralen (“Psoralen”) given with ultraviolet A (“UVA”) light, referred to as PUVA, which is approved for dermatological conditions such as disabling psoriasis not adequately responsive to other forms of therapy, idiopathic vitiligo and skin manifestations of CTCL in persons who have not been responsive to other forms of treatment. Psoralen is a mutagenic chemical that interferes with DNA causing mutations and other malignancies. Moreover, UVA is a carcinogenic light source that when combined with the Psoralen, results in serious adverse effects including secondary skin cancers; therefore, the FDA requires a Black Box warning for PUVA.

CTCL constitutes a rare group of NHLs, occurring in about 4% of the approximate 500,000 individuals living with NHL. We estimate, based upon review of historic published studies and reports and an interpolation of data on the incidence of CTCL, that it affects over 20,000 individuals in the U.S., with approximately 2,800 new cases seen annually.

Dusquetide

Dusquetide (research name: SGX94) is an innate defense regulator (“IDR”) that regulates the innate immune system to simultaneously reduce inflammation, eliminate infection and enhance tissue healing.

Dusquetide is based on a new class of short, synthetic peptides known as IDRs. It has a novel mechanism of action in that it modulates the body’s reaction to both injury and infection and is both simultaneously anti-inflammatory and anti-infective. IDRs have no direct antibiotic activity but modulate host responses, increasing survival after infections with a broad range of bacterial Gram-negative and Gram-positive pathogens including both antibiotic sensitive and resistant strains, as well as accelerating resolution of tissue damage following exposure to a variety of agents including bacterial pathogens, trauma and chemo- or radiation-therapy. IDRs represent a novel approach to the control of infection and tissue damage via highly selective binding to an intracellular adaptor protein, sequestosome-1, also known as p62, which has a pivotal function in signal transduction during activation and control of the innate defense system. Preclinical data indicate that IDRs may be active in models of a wide range of therapeutic indications including life-threatening bacterial infections as well as the severe side-effects of chemo- and radiation-therapy. Additionally, due to selective binding to p62, dusquetide may have potential anti-tumor action.

Dusquetide has demonstrated efficacy in numerous animal disease models including mucositis, colitis, skin infection and other bacterial infections and has been evaluated in a double-blind, placebo-controlled Phase 1 clinical trial in 84 healthy volunteers with both single ascending dose and multiple ascending dose components. Dusquetide was shown to have a good safety profile and be well-tolerated in all dose groups when administered by IV over 7 days and was consistent with safety results seen in pre-clinical studies. We believe that market opportunities for dusquetide include, but are not limited to, oral and gastrointestinal mucositis, acute Gram-positive bacterial infections (e.g., methicillin resistant *Staphylococcus aureus* (MRSA)), acute Gram-negative infections (e.g., acinetobacter, melioidosis), and acute radiation syndrome.

SGX942 – for Treating Oral Mucositis in Head and Neck Cancer

SGX942 is our product candidate containing our IDR technology, dusquetide, targeting the treatment of oral mucositis in head and neck cancer patients. Oral mucositis in this patient population is an area of unmet medical need where there are currently no approved drug therapies. Accordingly, we received Fast Track designation for the treatment of oral mucositis as a result of radiation and/or chemotherapy treatment in head and neck cancer patients from the FDA. In addition, dusquetide has been granted PIM designation in the UK by the MHRA for the treatment of severe oral mucositis in head and neck cancer patients receiving chemoradiation therapy. The U.S. Patent and Trademark Office and the European Patent Office granted us the patent titled “Novel Peptides and Analogs for Use in the Treatment of Oral Mucositis” on August 16, 2016 and January 23, 2019, respectively. The newly issued patent claims therapeutic use of dusquetide and related IDR analogs, and adds to composition of matter claims for dusquetide and related analogs that have been granted in the U.S. and worldwide.

We initiated a Phase 2 clinical study of SGX942 for the treatment of oral mucositis in head and neck cancer patients in December of 2013. We completed enrollment in this trial in the second half of 2015, and in December 2015 released positive preliminary results. In this Phase 2 proof-of-concept clinical study that enrolled 111 patients, SGX942, at a dose of 1.5 mg/kg, successfully reduced the median duration of severe oral mucositis by 50%, from 18 days to 9 days ($p=0.099$) in all patients and by 67%, from 30 days to 10 days ($p=0.040$) in patients receiving the most aggressive chemoradiation therapy for treatment of their head and neck cancer. The p-values met the prospectively defined statistical threshold of $p<0.1$ in the study protocol. A less severe occurrence of oral mucositis, ulcerative oral mucositis (defined as oral mucositis with a WHO score ≥ 2 corresponding to the occurrence of overt ulceration in the mouth), was also monitored during the study. In the patients receiving the most aggressive chemoradiation therapy, the median duration of oral mucositis was found to decrease from 65 days in the placebo treated patients to 51 days in the patients treated with SGX942 1.5 mg/kg ($p=0.099$).

In addition to identifying the best dose of 1.5 mg/kg, this study achieved all objectives, including increased incidence of “complete response” of tumor at the one month follow-up visit (47% in placebo vs. 63% in SGX942 at 1.5 mg/kg). Decreases in mortality and decreases in infection rate were also observed with SGX942 treatment, consistent with the preclinical results observed in animal models.

SGX942 was found to be generally safe and well tolerated, consistent with the safety profile observed in the prior Phase 1 study conducted in 84 healthy volunteers. The long-term (12 month) follow-up data was consistent with the preliminary positive safety and efficacy findings. While the placebo population experienced the expected 12-month survival rate of approximately 80%, as defined in the Surveillance, Epidemiology, and End Results statistics 1975-2012 from the National Cancer Institute, the SGX942 1.5 mg/kg treatment group reported a 12-month survival rate of 93% (7% mortality in the SGX942 1.5 mg/kg group compared to 19% in the placebo group). Similarly, tumor resolution (complete response) at 12 months was better in the SGX942 1.5 mg/kg treatment group relative to the placebo population (80% in the 1.5 mg/kg group compared to 74% in the placebo group). Moreover, in the patients receiving chemotherapy every third week, the SGX942 1.5 mg/kg treatment group had a tumor resolution rate (complete response) of 82% throughout the 12 months following chemoradiation therapy, while the placebo group experienced a 64% complete response rate. The long-term follow-up results from the Phase 2 study are reviewed in “Dusquetide: Reduction in Oral Mucositis associated with Enduring Ancillary Benefits in Tumor Resolution and Decreased Mortality in Head and Neck Cancer Patients” published online in Biotechnology Reports and available at the following link: <https://doi.org/10.1016/j.btre.2017.05.002>. In addition to safety, evaluations of other secondary efficacy endpoints, such as the utilization of opioid pain medication, indicated that the SGX942 1.5 mg/kg treatment group had a 40% decrease in the use of opioids at the later stage of the treatment phase of the trial, when oral mucositis is usually most severe and expected to increase pain medication use. This was in contrast to the placebo group, which demonstrated a 10% increase in use of opioids over this same period. Data from this Phase 2 trial was published online in the Journal of Biotechnology. The publication also delineates the supportive nonclinical data in this indication, demonstrating consistency in the qualitative and quantitative biological response, including dose response, across the nonclinical and clinical data sets. The results are available at the following link: <http://authors.elsevier.com/sd/article/S01681656116315668>.

On September 9, 2016, we and SciClone Pharmaceuticals, Inc. (“SciClone”) entered into an exclusive license agreement, pursuant to which we granted rights to SciClone to develop, promote, market, distribute and sell SGX942 in defined territories. Under the terms of the license agreement, SciClone will be responsible for all aspects of development, product registration and commercialization in the territories, having access to data generated by us. In exchange for exclusive rights, SciClone will pay us royalties on net sales, and we will supply commercial drug product to SciClone on a cost-plus basis, while maintaining worldwide manufacturing rights.

We have received clearance from the FDA to advance the pivotal Phase 3 protocol for SGX942 in the treatment of oral mucositis in patients with head and neck cancer receiving chemoradiation therapy. Additionally, we have received positive Scientific Advice from the European Medicines Agency (“EMA”) for the development of SGX942 as a treatment for oral mucositis in patients with head and neck cancer. The Scientific Advice from the EMA indicates that a single, double-blind, placebo-controlled, multinational, Phase 3 pivotal study, if successful, in conjunction with the Phase 2 dose-ranging study, is generally considered sufficient to support a marketing authorization application (“MAA”) to the EMA for potential licensure in Europe. The advice also provided several suggestions to strengthen the study design and data collection that were integrated into the final protocol. Scientific Advice is offered by the EMA to stakeholders for clarification of questions arising during development of medicinal products. The scope of Scientific Advice is limited to scientific issues and focuses on development strategies rather than pre-evaluation of data to support an MAA. Scientific Advice is legally non-binding and is based on the current scientific knowledge which may be subject to future changes.

We are working with leading oncology centers, a number of which participated in the Phase 2 study, to advance this Phase 3 clinical trial referred to as the “DOM-INNATE” study (Dusquetide treatment in Oral Mucositis – by modulating INNATE immunity). Based on the positive and previously published Phase 2 results (Study IDR-OM-01), the pivotal Phase 3 clinical trial (Study IDR-OM-02) is a highly powered, double-blind, randomized, placebo-controlled, multinational trial that will seek to enroll approximately 260 subjects with squamous cell carcinoma of the oral cavity and oropharynx who are scheduled to receive a minimum total cumulative radiation dose of 55 Gy fractionated as 2.0-2.2 Gy per day with concomitant cisplatin chemotherapy given as a dose of 80-100 mg/m² every third week. Subjects are randomized to receive either 1.5 mg/kg SGX942 or placebo given twice a week during and for two weeks following completion of chemoradiation therapy (“CRT”). The primary endpoint for the study is the median duration of severe oral mucositis, which is assessed by oral examination at each treatment visit and then through six weeks following completion of CRT. Oral mucositis is evaluated using the WHO Grading system. Severe oral mucositis is defined as a WHO Grade of ≥3. Subjects are followed for an additional 12 months after the completion of treatment.

During July 2017, we initiated our pivotal Phase 3 study with a controlled roll-out of U.S. study sites, followed by the addition of European centers in 2018. Approximately 50 U.S. and European oncology centers are participating in this pivotal Phase 3 study.

During September 2017, the National Institute of Dental and Craniofacial Research (“NIDCR”), part of the NIH, awarded us a SBIR grant of approximately \$1.5 million over two years to support the conduct of our Phase 3, multinational, randomized, double-blind, placebo-controlled study evaluating SGX942 (dusquetide) as a treatment for severe oral mucositis in patients with head and neck cancer receiving CRT.

On April 9, 2019, the U.S. Patent Office issued a new patent No. 10,253,068 titled “Novel Peptides for Treating and Preventing Immune-Related Disorders, Including Treating and Preventing Infection by Modulating Innate Immunity” for our dusquetide related analogs.

In April 2019, the Paediatric Committee of the EMA approved our Paediatric Investigation Plan (“PIP”) for SGX942, a prerequisite for filing a Marketing Authorization Application (“MAA”) for any new medicinal product in Europe. The EMA also agreed that we may defer conducting the PIP until successful completion of our ongoing pivotal Phase 3 clinical trial of SGX942, which allows us to file the adult indication MAA prior to completion of the PIP.

During August 2019, an independent DMC completed an unblinded interim analysis with data from approximately 90 subjects, including an assessment of the Phase 3 DOM-INNATE study’s primary efficacy endpoint. The DMC provided a positive recommendation to randomize approximately 70 additional subjects into the trial to maintain the rigorous assumption of 90% statistical power for the primary efficacy endpoint. No safety concerns were reported by the DMC based on the interim analysis. We currently anticipate final top-line results during the fourth quarter 2020.

In August 2019, the National Institutes of Dental and Craniofacial Research (NIDCR), part of the NIH, awarded us a Phase I Small Business Research (SBIR) of approximately \$150,000 to support the evaluation of SGX942 (dusquetide) in pediatric indications. This award will facilitate the assessment of SGX942 safety in juvenile animals, supporting future studies in pediatric populations, including oral mucositis indications in pediatric patients undergoing stem cell transplants and treatments for head and neck cancer.

We estimate the potential worldwide market for SGX942 is in excess of \$500 million for all applications, including the treatment of oral mucositis. This potential market information is a forward-looking statement, and investors are urged not to place undue reliance on this statement. While we have determined this potential market size based on assumptions that we believe are reasonable, there are a number of factors that could cause our expectations to change or not be realized.

Oral Mucositis

Mucositis is the clinical term for damage done to the mucosa by anticancer therapies. It can occur in any mucosal region, but is most commonly associated with the mouth, followed by the small intestine. We estimate, based upon our review of historic studies and reports, and an interpolation of data on the incidence of mucositis, that mucositis affects approximately 500,000 people in the U.S. per year and occurs in 40% of patients receiving chemotherapy. Mucositis can be severely debilitating and can lead to infection, sepsis, the need for parenteral nutrition and narcotic analgesia. The GI damage causes severe diarrhea. These symptoms can limit the doses and duration of cancer treatment, leading to sub-optimal treatment outcomes.

The mechanisms of mucositis have been extensively studied and have been linked to the interaction of chemotherapy and/or radiation therapy with the innate defense system. Bacterial infection of the ulcerative lesions is regarded as a secondary consequence of dysregulated local inflammation triggered by therapy-induced cell death, rather than as the primary cause of the lesions.

We estimate, based upon our review of historic studies and reports, and an interpolation of data on the incidence of oral mucositis, that oral mucositis is a subpopulation of approximately 90,000 patients in the U.S., with a comparable number in Europe. Oral mucositis almost always occurs in patients with head and neck cancer treated with radiation therapy (greater than 80% incidence of severe mucositis) and is common in patients undergoing high dose chemotherapy and hematopoietic cell transplantation, where the incidence and severity of oral mucositis depends greatly on the nature of the conditioning regimen used for myeloablation.

Oral BDP

Oral BDP (beclomethasone 17,21-dipropionate) represents a first-of-its-kind oral, locally acting therapy tailored to treat GI inflammation. BDP has been marketed in the U.S. and worldwide since the early 1970s as the active pharmaceutical ingredient in a nasal spray and in a metered-dose inhaler for the treatment of patients with allergic rhinitis and asthma. Oral BDP is specifically formulated for oral administration as a single product consisting of two tablets. One tablet is intended to release BDP in the upper sections of the GI tract and the other tablet is intended to release BDP in the lower sections of the GI tract.

Based on its pharmacological characteristics, oral BDP may have utility in treating other conditions of the gastrointestinal tract having an inflammatory component. We are planning to pursue development programs for the treatment of pediatric Crohn's disease, acute radiation enteritis and gastrointestinal acute radiation syndrome pending further grant funding. We are also exploring the possibility of testing oral BDP for local inflammation associated with ulcerative colitis, among other indications.

In July 2019, the European Patent Office issued two patents, both titled "Topically Active Steroids for use in Radiation and Chemotherapeutic Injury", following the expiration of the objection period. The new patents (#2,373,160 and #2,902,031) claim use of oral beclomethasone 17,21-dipropionate (BDP) for treatment of damage to the gastrointestinal (GI) tract as a result of acute radiation injury, including total body irradiation in the accidental or biodefense context.

We estimate the potential worldwide market for oral BDP is in excess of \$500 million for all applications, including the treatment of pediatric Crohn's disease. This potential market information is a forward-looking statement, and investors are urged not to place undue reliance on this statement. While we have determined this potential market size based on assumptions that we believe are reasonable, there are a number of factors that could cause our expectations to change or not be realized.

SGX203 – for Treating Pediatric Crohn's Disease

SGX203 is a two tablet delivery system of BDP specifically designed for oral use that allows for administration of immediate and delayed release BDP throughout the small bowel and the colon. The FDA has given SGX203 Orphan Drug designation as well as Fast Track designation for the treatment of pediatric Crohn's disease. We will pursue a pivotal Phase 3 clinical trial of SGX203 for the treatment of pediatric Crohn's disease contingent upon additional funding, such as through partnership funding support.

Pediatric Crohn's Disease

Crohn's disease causes inflammation of the GI tract. Crohn's disease can affect any area of the GI tract, from the mouth to the anus, but it most commonly affects the lower part of the small intestine, called the ileum. The swelling caused by the disease extends deep into the lining of the affected organ. The swelling can induce pain and can make the intestines empty frequently, resulting in diarrhea. Because the symptoms of Crohn's disease are similar to other intestinal disorders, such as irritable bowel syndrome and ulcerative colitis, it can be difficult to diagnose. People of Ashkenazi Jewish heritage have an increased risk of developing Crohn's disease.

Crohn's disease can appear at any age, but it is most often diagnosed in adults in their 20s and 30s. However, approximately 30% of people with Crohn's disease develop symptoms before 20 years of age. We estimate, based upon our review of historic published studies and reports, and an interpolation of data on the incidence of pediatric Crohn's disease, that pediatric Crohn's disease is a subpopulation of approximately 80,000 patients in the U.S. with a comparable number in Europe. Crohn's disease tends to be both severe and extensive in the pediatric population and a relatively high proportion (approximately 40%) of pediatric Crohn's patients have involvement of their upper gastrointestinal tract.

Crohn's disease presents special challenges for children and teens. In addition to bothersome and often painful symptoms, the disease can stunt growth, delay puberty, and weaken bones. Crohn's disease symptoms may sometimes prevent a child from participating in enjoyable activities. The emotional and psychological issues of living with a chronic disease can be especially difficult for young people.

SGX201 – for Preventing Acute Radiation Enteritis

SGX201 is a delayed-release formulation of BDP specifically designed for oral use. In 2012, we completed a Phase 1/2 clinical trial testing SGX201 in prevention of acute radiation enteritis. Patients with rectal cancer scheduled to undergo concurrent radiation and chemotherapy prior to surgery were randomized to one of four dose groups. The objectives of the study were to evaluate the safety and maximal tolerated dose of escalating doses of SGX201, as well as the preliminary efficacy of SGX201 for prevention of signs and symptoms of acute radiation enteritis. The study demonstrated that oral administration of SGX201 was safe and well tolerated across all four dose groups. There was also evidence of a potential dose response with respect to diarrhea, nausea and vomiting and the assessment of enteritis according to National Cancer Institute Common Terminology Criteria for Adverse Events for selected gastrointestinal events. In addition, the incidence of diarrhea was lower than that seen in published historical control data in this patient population. This program was supported in part by a \$500,000 two-year SBIR grant awarded by the NIH. We continue to work with our Radiation Enteritis medical advisors to identify additional funding opportunities to support the clinical development program.

We have received Fast Track designation from the FDA for SGX201 for acute radiation enteritis.

Acute Radiation Enteritis

External radiation therapy is used to treat most types of cancer, including cancer of the bladder, uterine, cervix, rectum, prostate, and vagina. During delivery of treatment, some level of radiation will also be delivered to healthy tissue, including the bowel, leading to acute and chronic toxicities. The large and small bowels are very sensitive to radiation and the larger the dose of radiation the greater the damage to normal bowel tissue. Radiation enteritis is a condition in which the lining of the bowel becomes swollen and inflamed during or after radiation therapy to the abdomen, pelvis, or rectum. Most tumors in the abdomen and pelvis need large doses, and almost all patients receiving radiation to the abdomen, pelvis, or rectum will show signs of acute enteritis.

Patients with acute enteritis may have nausea, vomiting, abdominal pain and bleeding, among other symptoms. Some patients may develop dehydration and require hospitalization. With diarrhea, the gastrointestinal tract does not function normally, and nutrients such as fat, lactose, bile salts, and vitamin B12 are not well absorbed.

Symptoms will usually resolve within two to six weeks after therapy has ceased. Radiation enteritis is often not a self-limited illness, as over 80% of patients who receive abdominal radiation therapy complain of a persistent change in bowel habits. Moreover, acute radiation injury increases the risk of development of chronic radiation enteropathy, and overall 5% to 15% of the patients who receive abdominal or pelvic irradiation will develop chronic radiation enteritis.

We estimate, based upon our review of historic published studies and reports, and an interpolation of data on the treatment courses and incidence of cancers occurring in the abdominal and pelvic regions, there to be over 100,000 patients annually in the U.S., with a comparable number in Europe, who receive abdominal or pelvic external beam radiation treatment for cancer, and these patients are at risk of developing acute and chronic radiation enteritis.

Public Health Solutions Overview

ThermoVax[®] – Thermostability Technology

ThermoVax[®] is a novel method for thermostabilizing vaccines with a variety of adjuvants, resulting in a single vial which can be reconstituted with water for injection immediately prior to use.

One of the adjuvants utilized in ThermoVax[®] is aluminum salts (known colloquially as Alum). Alum is the most widely employed adjuvant technology in the vaccine industry.

The value of ThermoVax[®] lies in its potential ability to eliminate the need for cold chain production, transportation, and storage for Alum-adjuvanted vaccines. This would relieve the high costs of producing and maintaining vaccines under refrigerated conditions. Based on historical reports from the World Health Organization and other scientific reports, we believe that a meaningful proportion of vaccine doses globally are wasted due to excursions from required cold chain temperature ranges. This is due to the fact that many vaccines need to be maintained either between 2 and 8 degrees Celsius (“C”), frozen below -20 degrees C, or frozen below -60 degrees C, and even brief excursions from these temperature ranges usually necessitates the destruction of the product or the initiation of costly stability programs specific for the vaccine lots in question. ThermoVax[®] has the potential to facilitate easier storage and distribution of strategic national stockpile vaccines for ricin exposure in emergency settings.

ThermoVax[®] development specifically in the context of an Alum adjuvant was supported pursuant to our \$9.4 million NIAID grant enabling development of thermo-stable ricin (RiVax[®]) and anthrax vaccines. Proof-of-concept preclinical studies with ThermoVax[®] indicate that it is able to produce stable vaccine formulations using adjuvants, protein immunogens, and other components that ordinarily would not withstand long temperature variations exceeding customary refrigerated storage conditions. These studies were conducted with our Alum-adjuvanted ricin toxin vaccine, RiVax[®] and our Alum-adjuvanted anthrax vaccine. Each vaccine was manufactured under precise lyophilization conditions using excipients that aid in maintaining native protein structure of the key antigen. When RiVax[®] was kept at 40 degrees C (104 degrees Fahrenheit) for up to one year, all of the animals vaccinated with the lyophilized RiVax[®] vaccine developed potent and high titer neutralizing antibodies. In contrast, animals that were vaccinated with the liquid RiVax[®] vaccine kept at 40 degrees C did not develop neutralizing antibodies and were not protected against ricin exposure. The ricin A chain is extremely sensitive to temperature and rapidly loses the ability to induce neutralizing antibodies when exposed to temperatures higher than 8 degrees C. When the anthrax vaccine was kept for up to 16 weeks at 70 degrees C, it was able to develop a potent antibody response, unlike the liquid formulation kept at the same temperature. Moreover, we also have demonstrated the compatibility of our thermostabilization technology with other secondary adjuvants such as TLR-4 agonists.

We also entered into a collaboration agreement with Axel Lehrer, PhD of the Department of Tropical Medicine, Medical Microbiology and Pharmacology, John A. Burns School of Medicine, University of Hawai’i at Manoa (“UH Manoa”) and Hawaii Biotech, Inc. (“HBI”) to develop a heat stable subunit Ebola vaccine. Dr. Lehrer, a co-inventor of the Ebola vaccine with HBI, has shown proof of concept efficacy with subunit Ebola vaccines in non-human primates. The most advanced Ebola vaccines involve the use of vesicular stomatitis virus and adenovirus vectors – live, viral vectors which complicate the manufacturing, stability and storage requirements. Dr. Lehrer’s vaccine candidate is based on highly purified recombinant protein antigens, circumventing many of these manufacturing difficulties. Dr. Lehrer and HBI have developed a robust manufacturing process for the required proteins. Application of ThermoVax[®] may allow for a product that can avoid the need for cold chain distribution and storage, yielding a vaccine ideal for use in both the developed and developing world. This agreement has expired in accordance with its terms.

During September 2017, we announced we will be participating in a NIAID Research Project (R01) grant awarded to UH Manoa for the development of a trivalent thermostabilized filovirus vaccine (including protection against *Zaire ebolavirus*, *Sudan ebolavirus* and *Marburg Marburgvirus*), with our awarded funding of approximately \$700,000 over five years. Previous collaborations demonstrated the feasibility of developing a heat stable subunit Ebola vaccine. Under the terms of the subaward, we will continue to support vaccine formulation development with our proprietary vaccine thermostabilization technology, ThermoVax[®]. Ultimately, the objective is to produce a thermostable trivalent filovirus vaccine for protection against Ebola and related diseases, allowing worldwide distribution without the need for cold storage. Based on current U.S. government needs, efforts have recently been expanded to focus on a monovalent or bivalent vaccine to specifically address *Marburg marburgvirus*.

On December 21, 2010, we executed a worldwide exclusive license agreement with the University of Colorado (“UC”) for certain patents relating to ThermoVax[®] in all fields of use. In April 2018, the UC delivered a notice of termination of our license agreement based upon our failure to achieve one of the development milestones: initiation of the Phase 1 clinical trial of the heat stabilization technology by March 31, 2018. After negotiating with the UC, we and the UC agreed to extend the termination date to October 31, 2018 in order to allow us time to agree upon a potential agreement that would allow us to keep the rights to, and to continue to develop, the heat stabilization technology or a product candidate containing the heat stabilization technology in our field of use.

On October 31, 2018, in a series of related transactions, (a) we and the UC agreed to terminate the original license agreement, (b) the UC and VitriVax, Inc. (“VitriVax”) executed a worldwide exclusive license agreement for the heat stabilization technology for all fields of use, and (c) we and VitriVax executed a worldwide exclusive sublicense agreement for the heat stabilization technology for use in the fields of ricin and Ebola vaccines. We paid a \$100,000 sublicense fee on the effective date of the sublicense agreement. To maintain the sublicense we are obliged to pay a minimum annual royalty of \$20,000 until first commercial sale of a sublicensed product, upon which point, we shall pay an earned royalty of 2% of net sales subject to a minimum royalty of \$50,000 each year. We are also required to pay royalty on any sub-sublicense income based on a declining percentage of all sub-sublicense income calculated within the contractual period until reaching a minimum of 15% after two years. In addition, we are required to pay VitriVax milestone fees of: (a) \$50,000 upon initiation of a Phase II clinical trial of the sublicensed product, (b) \$200,000 upon regulatory approval of a sublicensed product, and (c) \$1 million upon achieving \$10 million in aggregate net sales of a sublicensed product in the U.S. or equivalent. To date none of these milestones have been met.

On February 7, 2019, European Journal of Pharmaceutics and Biopharmaceutics published a scientific article demonstrating the successful thermostabilization of an Alum-adjuvanted Ebola subunit vaccine candidate.

On July 31, 2019, we and our collaborators presented two posters on the trivalent vaccine program. The first poster outlined the stability of the lyophilized formulations of the Ebola virus glycoprotein upon lyophilization and storage at temperatures as high as 40 degrees C (104 degrees F) and identified potential stability assays. The second poster further demonstrated the ability to co-lyophilize multiple antigens in the presence of an emulsion forming adjuvant, facilitating the development of a thermostable trivalent vaccine.

On March 11 2020, we entered into a research collaboration with the Axel Lehrer, PhD of the Department of Tropical Medicine, Medical Microbiology and Pharmacology, John A. Burns School of Medicine, UH Manoa to further expand the filovirus collaboration to investigation of potential coronavirus vaccines, including for SARS-CoV-2 (causing COVID-19). This research collaboration will utilize the technology platform developed in the search for filovirus vaccines and will use well-defined surface glycoprotein(s) from one or more coronaviruses, which are expected to be protective for COVID-19.

RiVax[®] – Ricin Toxin Vaccine

RiVax[®] is our proprietary vaccine candidate being developed to protect against exposure to ricin toxin and if approved, would be the first ricin vaccine. The immunogen in RiVax[®] induces a protective immune response in animal models of ricin exposure and functionally active antibodies in humans. The immunogen consists of a genetically inactivated ricin A chain subunit that is enzymatically inactive and lacks residual toxicity of the holotoxin. RiVax[®] has demonstrated statistically significant ($p < 0.0001$) preclinical survival results, providing 100% protection against acute lethality in an aerosol exposure non-human primate model (Roy et al, 2015, Thermostable ricin vaccine protects rhesus macaques against aerosolized ricin: Epitope-specific neutralizing antibodies correlate with protection, PNAS USA 112:3782-3787), and has also been shown to be well tolerated and immunogenic in two Phase 1 clinical trials in healthy volunteers. Results of the first Phase 1 human trial of RiVax[®] established that the immunogen was safe and induced antibodies that we believe may protect humans from ricin exposure. The antibodies generated from vaccination, concentrated and purified, were capable of conferring immunity passively to recipient animals, indicating that the vaccine was capable of inducing functionally active antibodies in humans. The outcome of this study was published in the Proceedings of the National Academy of Sciences (Vitetta et al., 2006, A Pilot Clinical Trial of a Recombinant Ricin Vaccine in Normal Humans, PNAS, 103:2268-2273). The second trial which was completed in September 2012 and was sponsored by University of Texas Southwestern Medical Center (“UTSW”), evaluated a more potent formulation of RiVax[®] that contained an Alum-adjutant. The results of the Phase 1b study indicated that Alum-adjuvanted RiVax[®] was safe and well tolerated, and induced greater ricin neutralizing antibody levels in humans than adjuvant-free RiVax[®]. The outcomes of this second study were published in the Clinical and Vaccine Immunology (Vitetta et al., 2012, Recombinant Ricin Vaccine Phase 1b Clinical Trial, Clin. Vaccine Immunol. 10:1697-1699). We have adapted the original manufacturing process for the immunogen contained in RiVax[®] for thermostability and large scale manufacturing and recent studies have confirmed that the thermostabilized RiVax[®] formulation enhances the stability of the RiVax[®] antigen, enabling storage for at least 1 year at temperatures up to 40 °C (104 °F). The program will pursue approval via the FDA “Animal Rule” since it is not possible to test the efficacy of the vaccine in a clinical study which would expose humans to ricin. Uniform, easily measured and species-neutral immune correlates of protection that can be measured in humans and animals, and are indicative of animal survival to subsequent ricin challenge, are central to the application of the “Animal Rule”. Recent work has identified such potential correlates of immune protection in animals and work to qualify and validate these approaches is continuing, with the goal of utilizing these assays in a planned Phase 1/2 clinical trial with the thermostable RiVax[®] formulation. During September 2018, we published an extended stability study of RiVax[®], showing up to 100% protection in mice after 12 months storage at 40 °C (104 °F) as well as identification of a potential in vitro stability indicating assay, critical to adequately confirming the long-term shelf life of the vaccine. We have entered into a collaboration with IDT Biologika GmbH to scale-up the formulation/filling process and continue development and validation of analytical methods established at IDT to advance the program. We also have initiated a development agreement with Emergent BioSolutions, Inc. to implement a commercially viable, scalable production technology for the RiVax[®] drug substance protein antigen.

The development of RiVax[®] has been sponsored through a series of overlapping challenge grants, UC1, and cooperative grants, U01, from the NIH, granted to us and to UTSW where the vaccine originated. The second clinical trial was supported by a grant from the FDA's Office of Orphan Products to UTSW. To date, we and UTSW have collectively received approximately \$25 million in grant funding from the NIH for the development of RiVax[®]. In September 2014, we entered into a contract with the NIH for the development of RiVax[®] that would provide up to an additional \$24.7 million of funding in the aggregate if options to extend the contract are exercised by the NIH. The development agreements with Emergent BioSolutions and IDT are specifically funded under this NIH contract.

During June 2017 NIAID exercised an option for the evaluation of RiVax[®] to fund additional animal efficacy studies. The exercised option will provide us with approximately \$2.0 million in additional funding. Additionally, during August 2017 NIAID exercised an option to fund good manufacturing practices compliant RiVax[®] bulk drug substance and finished drug product manufacturing, which is required for the conduct of future preclinical and clinical safety and efficacy studies. The exercised option will provide us with approximately \$2.5 million in additional non-dilutive funding, bringing the total amount awarded to date under this contract to \$21.2 million, of which \$6.9 million is still available. If all contract options are exercised, the total award of up to \$24.7 million will support the preclinical, manufacturing and clinical development activities necessary to advance heat stable RiVax[®] with the FDA. In addition to the ongoing funding of up to \$24.7 million for the development of RiVax[®], biomarkers for RiVax[®] testing have been successfully identified, facilitating potential approval under the FDA Animal Rule.

During December 2019, we initiated a third Phase 1 double-blind, placebo-controlled, randomized study in eight healthy adult volunteer subjects designed to evaluate the safety and immunogenicity of RiVax[®] utilizing ThermoVax[®]. During January 2020, we suspended the study after the manufacturer of the drug substance notified us that, after release of the final drug product to us, the manufacturer identified that the active drug substance tested outside the established specification parameters. Two subjects had received doses as part of the study before the manufacturer provided this notice. Those two subjects will continue to be monitored and data captured in accordance with the study protocol; however, they will not receive further doses of study drug. A clinical safety report will be generated at study completion.

RiVax[®] has been granted Orphan Drug designation as well as Fast Track designation by the FDA for the prevention of ricin intoxication. In addition, RiVax[®] has also been granted Orphan Drug designation in the European Union ("EU") from the EMA Committee for Orphan Medical Products.

Assuming development efforts are successful for RiVax[®], we believe potential government procurement contract(s) could reach as much as \$200 million. This potential procurement contract information is a forward-looking statement, and investors are urged not to place undue reliance on this statement. While we have determined this potential procurement contract value based on assumptions that we believe are reasonable, there are a number of factors that could cause our expectations to change or not be realized.

As a new chemical entity, an FDA approved RiVax[®] vaccine has the potential to qualify for a biodefense Priority Review Voucher ("PRV"). Approved under the 21st Century Cures Act in late 2016, the biodefense PRV is awarded upon approval as a medical countermeasure when the active ingredient(s) have not been otherwise approved for use in any context. PRVs are transferable and can be sold, with sales in recent years in excess of \$100 million. When redeemed, PRVs entitle the user to an accelerated review period of nine months, saving a median of seven months review time as calculated in 2009. However, FDA must be advised 90 days in advance of the use of the PRV and the use of a PRV is associated with an additional user fee (\$2.2 million for fiscal year 2020).

Ricin Toxin

Ricin toxin can be cheaply and easily produced, is stable over long periods of time, is toxic by several routes of exposure and thus has the potential to be used as a biological weapon against military and/or civilian targets. As a bioterrorism agent, ricin could be disseminated as an aerosol, by injection, or as a food supply contaminant. The potential use of ricin toxin as a biological weapon of mass destruction has been highlighted in a Federal Bureau of Investigation Bioterror report released in November 2007 titled *Terrorism 2002-2005*, which states that “Ricin and the bacterial agent anthrax are emerging as the most prevalent agents involved in WMD investigations” (http://www.fbi.gov/stats-services/publications/terrorism-2002-2005/terror02_05.pdf). In recent years, Al Qaeda in the Arabian Peninsula has threatened the use of ricin toxin to poison food and water supplies and in connection with explosive devices. Domestically, the threat from ricin remains a concern for security agencies. In April 2013, letters addressed to the U.S. President, a Senator and a judge tested positive for ricin. As recently as October 2018, an envelope addressed to President Trump was suspected to contain this potent and potentially lethal toxin, which was subsequently confirmed to contain pieces of castor beans used to make ricin.

The Centers for Disease Control and Prevention has classified ricin toxin as a Category B biological agent. Ricin works by first binding to glycoproteins found on the exterior of a cell, and then entering the cell and inhibiting protein synthesis leading to cell death. Once exposed to ricin toxin, there is no effective therapy available to reverse the course of the toxin. The recent ricin threat to government officials has heightened the awareness of this toxic threat. Currently, there is no FDA approved vaccine to protect against the possibility of ricin toxin being used in a terrorist attack, or its use as a weapon on the battlefield nor is there a known antidote for ricin toxin exposure.

SGX943 – for Treating Emerging and/or Antibiotic-Resistant Infectious Diseases

SGX943 is an IDR, containing the same active ingredient as SGX942. Dusquetide is a fully synthetic, 5-amino acid peptide with high aqueous solubility and stability. Extensive *in vivo* preclinical studies have demonstrated enhanced clearance of bacterial infection with SGX943 administration. SGX943 has shown efficacy against both Gram-negative and Gram-positive bacterial infections in preclinical models, independent of whether the bacteria is antibiotic-resistant or antibiotic-sensitive.

The innate immune system is responsible for rapid and non-specific responses to combat bacterial infection. Augmenting these responses represents an alternative approach to treating bacterial infections. In animal models, IDRs are efficacious against both antibiotic-sensitive and antibiotic-resistant infections, both Gram-positive and Gram-negative bacteria, and are active irrespective of whether the bacteria occupies a primarily extracellular or intracellular niche. IDRs are also effective as stand-alone agents or in conjunction with antibiotics. An IDR for the treatment of serious bacterial infections encompasses a number of clinical advantages including:

- Treatment when antibiotics are contraindicated, such as:
 - before the infectious organism and/or its antibiotic susceptibility is known; or
 - in at-risk populations prior to infection.
- An ability to be used as an additive, complementary treatment with antibiotics, thereby:
 - enhancing efficacy of sub-optimal antibiotic regimens (e.g., partially antibiotic-resistant infections);
 - enhancing clearance of infection, thereby minimizing the generation of antibiotic resistance (e.g., in treating melioidosis); and
 - reducing the required antibiotic dose, again potentially minimizing the generation of antibiotic resistance.
- An ability to modulate the deleterious consequences of inflammation in response to the infection, including the inflammation caused by antibiotic-driven bacterial lysis; and
- Being unlikely to generate bacterial resistance since the IDR acts on the host, and not the pathogen.

Importantly, systemic inflammation and multi-organ failure is the ultimate common outcome of not only emerging and/or antibiotic-resistant infectious diseases, but also of most biothreat agents (e.g., *Burkholderia pseudomallei*), indicating that dusquetide would be applicable not only to antibiotic-resistant infection, but also to biothreat agents, especially where the pathogen is not known and/or has been engineered for enhanced antibiotic resistance.

In May 2019, we were awarded a Defense Threat Reduction Agency (“DTRA”) subcontract of approximately \$600,000 over three years to participate in a biodefense contract for the development of medical countermeasures against bacterial threat agents. As of December 31, 2019, there was negligible revenue earned or expense incurred related to the DTRA subcontract.

The Drug Approval Process

The FDA and comparable regulatory agencies in state, local and foreign jurisdictions impose substantial requirements on the clinical development, manufacture and marketing of new drug and biologic products. The FDA, through regulations that implement the Federal Food, Drug, and Cosmetic Act, as amended (“FDCA”), and other laws and comparable regulations for other agencies, regulate research and development activities and the testing, manufacture, labeling, storage, shipping, approval, recordkeeping, advertising, promotion, sale, export, import and distribution of such products. The regulatory approval process is generally lengthy, expensive and uncertain. Failure to comply with applicable FDA and other regulatory requirements can result in sanctions being imposed on us or the manufacturers of our products, including holds on clinical research, civil or criminal fines or other penalties, product recalls, or seizures, or total or partial suspension of production or injunctions, refusals to permit products to be imported into or exported out of the U.S., refusals of the FDA to grant approval of drugs or to allow us to enter into government supply contracts, withdrawals of previously approved marketing applications and criminal prosecutions.

Before human clinical testing in the U.S. of a new drug compound or biological product can commence, an Investigational New Drug (“IND”), application is required to be submitted to the FDA. The IND application includes results of pre-clinical animal studies evaluating the safety and efficacy of the drug and a detailed description of the clinical investigations to be undertaken.

Clinical trials are normally done in three phases, although the phases may overlap. Phase 1 trials are smaller trials concerned primarily with metabolism and pharmacologic actions of the drug and with the safety of the product. Phase 2 trials are designed primarily to demonstrate effectiveness and safety in treating the disease or condition for which the product is indicated. These trials typically explore various doses and regimens. Phase 3 trials are expanded clinical trials intended to gather additional information on safety and effectiveness needed to clarify the product’s benefit-risk relationship and generate information for proper labeling of the drug, among other things. The FDA receives reports on the progress of each phase of clinical testing and may require the modification, suspension or termination of clinical trials if an unwarranted risk is presented to patients. When data is required from long-term use of a drug following its approval and initial marketing, the FDA can require Phase 4, or post-marketing, studies to be conducted.

With certain exceptions, once successful clinical testing is completed, the sponsor can submit a NDA, for approval of a drug, or a Biologic License Application (“BLA”), for biologics such as vaccines, which will be reviewed, and if successful, approved by the FDA, allowing the product to be marketed. The process of completing clinical trials for a new drug is likely to take a number of years and require the expenditure of substantial resources. Furthermore, the FDA or any foreign health authority may not grant an approval on a timely basis, if at all. The FDA may deny the approval of an NDA or BLA, in its sole discretion, if it determines that its regulatory criteria have not been satisfied or may require additional testing or information. Among the conditions for marketing approval is the requirement that the prospective manufacturer’s quality control and manufacturing procedures conform to good manufacturing practice regulations. In complying with standards contained in these regulations, manufacturers must continue to expend time, money and effort in the area of production, quality control and quality assurance to ensure full technical compliance. Manufacturing facilities, both foreign and domestic, also are subject to inspections by, or under the authority of, the FDA and by other federal, state, local or foreign agencies.

Even after initial FDA or foreign health authority approval has been obtained, further studies, including Phase 4 post-marketing studies, may be required to provide additional data on safety and will be required to gain approval for the marketing of a product as a treatment for clinical indications other than those for which the product was initially tested. For certain drugs intended to treat serious, life-threatening conditions that show great promise in earlier testing, the FDA can also grant conditional approval. However, drug developers are required to study the drug further and verify clinical benefit as part of the conditional approval provision, and the FDA can revoke approval if later testing does not reproduce previous findings. The FDA may also condition approval of a product on the sponsor agreeing to certain mitigation strategies that can limit the unfettered marketing of a drug. Also, the FDA or foreign regulatory authority will require post-marketing reporting to monitor the side effects of the drug. Results of post-marketing programs may limit or expand the further marketing of the product. Further, if there are any modifications to the drug, including any change in indication, manufacturing process, labeling or manufacturing facility, an application seeking approval of such changes will likely be required to be submitted to the FDA or foreign regulatory authority.

In the U.S., the FDCA, the Public Health Service Act, the Federal Trade Commission Act, and other federal and state statutes and regulations govern, or influence the research, testing, manufacture, safety, labeling, storage, record keeping, approval, advertising and promotion of drug, biological, medical device and food products. Noncompliance with applicable requirements can result in, among other things, fines, recall or seizure of products, refusal to permit products to be imported into the U.S., refusal of the government to approve product approval applications or to allow us to enter into government supply contracts, withdrawal of previously approved applications and criminal prosecution. The FDA may also assess civil penalties for violations of the FDCA involving medical devices.

For biodefense development, such as with RiVax[®], the FDA has instituted policies that are expected to result in shorter pathways to market. This potentially includes approval for commercial use utilizing the results of animal efficacy trials, rather than efficacy trials in humans. However, we will still have to establish that the vaccine and countermeasures it is developing are safe in humans at doses that are correlated with the beneficial effect in animals. Such clinical trials will also have to be completed in distinct populations that are subject to the countermeasures; for instance, the very young and the very old, and in pregnant women, if the countermeasure is to be licensed for civilian use. Other agencies will have an influence over the benefit-risk scenarios for deploying the countermeasures and in establishing the number of doses utilized in the Strategic National Stockpile. We may not be able to sufficiently demonstrate the animal correlation to the satisfaction of the FDA, as these correlates are difficult to establish and are often unclear. Invocation of the animal rule may raise issues of confidence in the model systems even if the models have been validated. For many of the biological threats, the animal models are not available and we may have to develop the animal models, a time-consuming research effort. There are few historical precedents, or recent precedents, for the development of new countermeasure for bioterrorism agents. Despite the animal rule, the FDA may require large clinical trials to establish safety and immunogenicity before licensure and it may require safety and immunogenicity trials in additional populations. Approval of biodefense products may be subject to post-marketing studies, and could be restricted in use in only certain populations.

Vaccines are approved under the BLA process that exists under the Public Health Service Act. In addition to the greater technical challenges associated with developing biologics, the potential for generic competition is lower for a BLA product than a small molecule product subject to an NDA under the Federal Food, Drug and Cosmetic Act. Under the Patient Protection and Affordable Care Act enacted in 2010, a “generic” version of a biologic is known as a biosimilar and the barriers to entry – whether legal, scientific, or logistical – for a biosimilar version of a biologic approved under a BLA are higher.

Orphan Drug Designation

Under the Orphan Drug Act, the FDA may grant orphan drug designation to drugs or biologics intended to treat a rare disease or condition – generally a disease or condition that affects fewer than 200,000 individuals in the U.S. Orphan drug designation must be requested before submitting an NDA or BLA. After the FDA grants orphan drug designation, the generic identity of the drug or biologic and its potential orphan use are disclosed publicly by the FDA. Orphan drug designation does not convey any advantage in, or shorten the duration of, the regulatory review and approval process. The first NDA or BLA applicant to receive FDA approval for a particular active ingredient to treat a particular disease with FDA orphan drug designation is entitled to a seven-year exclusive marketing period in the U.S. for that product, for that indication. During the seven-year exclusivity period, the FDA may not approve any other applications to market the same drug or biologic for the same disease, except in limited circumstances, such as a showing of clinical superiority to the product with orphan drug exclusivity. Orphan drug exclusivity does not prevent the FDA from approving a different drug or biologic for the same disease or condition, or the same drug or biologic for a different disease or condition. Among the other benefits of orphan drug designation are tax credits for certain research and a waiver of the NDA or BLA application user fee.

Fast Track Designation and Accelerated Approval

The FDA is required to facilitate the development, and expedite the review, of drugs or biologics that are intended for the treatment of a serious or life-threatening disease or condition for which there is no effective treatment and which demonstrate the potential to address unmet medical needs for the condition. Under the fast track program, the sponsor of a new drug or biologic candidate may request that the FDA designate the candidate for a specific indication as a fast track drug or biologic concurrent with, or after, the filing of the IND for the candidate. The FDA must determine if the drug or biologic candidate qualifies for fast track designation within 60 days of receipt of the sponsor's request. Unique to a fast track product, the FDA may initiate review of sections of a fast track product's NDA or BLA before the application is complete. This rolling review is available if the applicant provides, and the FDA approves, a schedule for the submission of the remaining information and the applicant pays applicable user fees. However, the FDA's time period goal for reviewing an application does not begin until the last section of the NDA or BLA is submitted. Additionally, the fast track designation may be withdrawn by the FDA if the FDA believes that the designation is no longer supported by data emerging in the clinical trial process.

Any product submitted to the FDA for marketing, including under a fast track program, may be eligible for other types of FDA programs intended to expedite development and review, such as accelerated approval. Drug or biological products studied for their safety and effectiveness in treating serious or life-threatening illnesses and that provide meaningful therapeutic benefit over existing treatments may receive accelerated approval, which means the FDA may approve the product based upon 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.

In clinical trials, a surrogate endpoint is a measurement of laboratory or clinical signs of a disease or condition that substitutes for a direct measurement of how a patient feels, functions, or survives. Surrogate endpoints can often be measured more easily or more rapidly than clinical endpoints. A drug or biologic candidate approved on this basis is subject to rigorous post-marketing compliance requirements, including the completion of Phase 4 or post-approval clinical trials to confirm the effect on the clinical endpoint. Failure to conduct required post-approval studies, or confirm a clinical benefit during post-marketing studies, will allow the FDA to withdraw the drug or biologic from the market on an expedited basis. All promotional materials for drug candidates approved under accelerated regulations are subject to prior review by the FDA.

Pediatric Information

Under the Pediatric Research Equity Act ("PREA"), NDAs or BLAs or supplements to NDAs or BLAs must contain data 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 drug is safe and effective. The FDA may grant full or partial waivers, or deferrals, for submission of data. Unless otherwise required by regulation, PREA does not apply to any drug for an indication for which orphan designation has been granted.

Early Access to Medicines Scheme

Launched in April 2014 in the United Kingdom by the MHRA, the Early Access to Medicines Scheme (“EAMS”) offers severely ill patients with life-threatening and seriously debilitating conditions the lifeline of trying ground-breaking new medicines earlier than they would normally be accessible. PIM designation is the first phase of EAMS and is awarded following an assessment of early nonclinical and clinical data by the MHRA. The criteria product candidates must meet to obtain PIM designation are:

- Criterion 1 – The condition should be life-threatening or seriously debilitating with a high unmet medical need (i.e., there is no method of treatment, diagnosis or prevention available or existing methods have serious limitations).
- Criterion 2 – The medicinal product is likely to offer major advantage over methods currently used in the UK.
- Criterion 3 – The potential adverse effects of the medicinal product are likely to be outweighed by the benefits, allowing for the reasonable expectation of a positive benefit risk balance. A positive benefit risk balance should be based on preliminary scientific evidence that the safety profile of the medicinal product is likely to be manageable and acceptable in relation to the estimated benefits.

False Claims Laws

The federal False Claims Act prohibits, among other things, any person or entity from knowingly presenting, or causing to be presented, a false claim for payment to, or approval by, the federal government or knowingly making, using, or causing to be made or used a false record or statement material to a false or fraudulent claim to the federal government. As a result of a modification made by the Fraud Enforcement and Recovery Act of 2009, a claim includes “any request or demand” for money or property presented to the U.S. government.

Anti-Kickback Laws

The federal Anti-Kickback Statute prohibits, among other things, any person or entity, from knowingly and willfully offering, paying, soliciting or receiving any remuneration, directly or indirectly, overtly or covertly, in cash or in kind, to induce or in return for purchasing, leasing, ordering or arranging for the purchase, lease or order of any item or service reimbursable under Medicare, Medicaid or other federal healthcare programs. The term remuneration has been interpreted broadly to include anything of value. The Anti-Kickback Statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on one hand and prescribers, purchasers, and formulary managers on the other.

United States Healthcare Reform

Federal Physician Payments Sunshine Act and its implementing regulations require that certain manufacturers of drugs, devices, biological and medical supplies for which payment is available under Medicare, Medicaid or the Children’s Health Insurance Program (with certain exceptions) to report information related to certain payments or other transfers of value made or distributed to physicians and teaching hospitals, or to entities or individuals at the request of, or designated on behalf of, the physicians and teaching hospitals and to report annually certain ownership and investment interests held by physicians and their immediate family members.

In addition, we may be subject to data privacy and security regulation by both the federal government and the states in which we conduct our business. The Health Insurance Portability and Accountability Act (“HIPAA”), as amended by the Health Information Technology for Economic and Clinical Health Act (“HITECH”), and its implementing regulations, imposes certain requirements relating to the privacy, security and transmission of individually identifiable health information. Among other things, HITECH makes HIPAA’s privacy and security standards directly applicable to “business associates” – independent contractors or agents of covered entities that receive or obtain protected health information in connection with providing a service on behalf of a covered entity. HITECH also created four new tiers of civil monetary penalties, amended HIPAA to make civil and criminal penalties directly applicable to business associates and possibly other persons, and gave state attorneys general new authority to file civil actions for damages or injunctions in federal courts to enforce the federal HIPAA laws and seek attorneys’ fees and costs associated with pursuing federal civil actions. In addition, state laws govern the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and may not have the same effect, thus complicating compliance efforts.

Third-Party Suppliers and Manufacturers

Drug substance and drug product manufacturing is outsourced to qualified suppliers. We do not have manufacturing capabilities/infrastructure and do not intend to develop the capacity to manufacture drug products substances. We have agreements with third-party manufacturers to supply bulk drug substances for our product candidates and with third parties to formulate, package and distribute our product candidates. Our employees include professionals with expertise in pharmaceutical manufacturing development, quality assurance and third party supplier management who oversee work conducted by third-party companies. We believe that we have on hand or can easily obtain sufficient amounts of product candidates to complete our currently contemplated clinical trials. All of the drug substances used in our product candidates currently are manufactured by single suppliers. While we have not experienced any supply disruptions, the number of manufacturers of the drug substances is limited. In the event it is necessary or advisable to acquire supplies from alternative suppliers, assuming commercially reasonable terms could be reached, the challenge would be the efficient transfer of technology and know-how from current manufactures to the new supplier. Formulation and distribution of our finished product candidates also currently are conducted by single suppliers but we believe that alternative sources for these services are readily available on commercially reasonable terms, subject to the efficient transfer of technology and know-how from current suppliers to the new supplier.

All of the current agreements for the supply of bulk drug substances for our product candidates and for the formulation or distribution of our product candidates relate solely to the development (including preclinical and clinical) of our product candidates. Under these contracts, our product candidates are manufactured upon our order of a specific quantity. In the event that we obtain marketing approval for a product candidate, we will qualify secondary suppliers for all key manufacturing activities supporting the marketing application.

Marketing and Collaboration

We do not currently have any sales and marketing capability, other than to potentially market our biodefense vaccine products directly to government agencies. With respect to other commercialization efforts, we currently intend to seek distribution and other collaboration arrangements for the sales and marketing of any product candidate that is approved, while also evaluating the potential to commercialize on our own in orphan disease indications. From time to time, we have had and are having strategic discussions with potential collaboration partners for our biodefense vaccine product candidates, although no assurance can be given that we will be able to enter into one or more collaboration agreements for our product candidate on acceptable terms, if at all. We believe that both military and civilian health authorities of the U.S. and other countries will increase their stockpiling of therapeutics and vaccines to treat and prevent diseases and conditions that could ensue following a bioterrorism attack.

On December 20, 2012, we re-acquired the North American and European commercial rights to oral BDP through an amendment of our collaboration and supply agreement with Sigma-Tau Pharmaceuticals, Inc., which is now known as Leadiant Biosciences, Inc. (“Leadiant”). The amendment requires us to make certain approval and commercialization milestone payments to Leadiant which could reach up to \$6 million. In addition, we have agreed to pay Leadiant: (a) a royalty amount equal to 3% of all net sales of oral BDP made directly by us, and any third-party partner and/or their respective affiliates in the U.S., Canada, Mexico and in each country in the European Territory for the later to occur of: (i) a period of ten years from the first commercial sale of oral BDP in each country, or (ii) the expiration of our patents and patent applications relating to oral BDP in such country (the “Payment Period”); and (b) 15% of all up-front payments, milestone payments and any other consideration (exclusive of equity payments) received by us and/or a potential partner from us and/or potential partner’s licensees, distributors and agents for oral BDP in each relevant country in the territory, which amount will be paid on a product-by-product and a country-by-country basis for the Payment Period.

On August 25, 2013, we entered into an agreement with SciClone Pharmaceuticals, Inc. (“SciClone”), pursuant to which SciClone provided us with access to its oral mucositis clinical and regulatory data library in exchange for exclusive commercialization rights for SGX942 in the People’s Republic of China, including Hong Kong and Macau, subject to the negotiation of economic terms. SciClone’s data library was generated from two sequential Phase 2 clinical studies conducted in 2010 and 2012 evaluating SciClone’s compound, SCV-07, for the treatment of oral mucositis caused by chemoradiation therapy in head and neck cancer patients, before SciClone terminated its program. By analyzing data available from the placebo subjects in the SciClone trials, we acquired valuable insight into disease progression, along with quantitative understanding of its incidence and severity in the head and neck cancer patient population. This information assisted us with the design of the SGX942 Phase 2 clinical trial, in which positive preliminary results were announced in December 2015.

On September 9, 2016, we and SciClone entered into an exclusive license agreement, pursuant to which we granted rights to SciClone to develop, promote, market, distribute and sell SGX942 in the People's Republic of China, including Hong Kong and Macau, as well as Taiwan, South Korea and Vietnam. Under the terms of the license agreement, SciClone will be responsible for all aspects of development, product registration and commercialization in the territory, having access to data generated by us. In exchange for exclusive rights, SciClone will pay us royalties on net sales, and we will supply commercial drug product to SciClone on a cost-plus basis, while maintaining worldwide manufacturing rights. We also entered into a common stock purchase agreement with SciClone pursuant to which we sold 352,942 shares of our common stock to SciClone for approximately \$8.50 per share, for an aggregate price of \$3,000,000.

Competition

Our competitors are pharmaceutical and biotechnology companies, most of whom have considerably greater financial, technical, and marketing resources than we do. Universities and other research institutions, including the U.S. Army Medical Research Institute of Infectious Diseases, also compete in the development of treatment technologies, and we face competition from other companies to acquire rights to those technologies.

SGX301 Competition

The FDA has approved several treatments for later stages (IIB-IV) of CTCL and/or in conditions that are unresponsive to prior treatment. Three are targeted therapies (Targretin[®]-caps, Ontak[®] and Adcetris[®]), two are histone deacetylases inhibitors (Zolixa[®] and Istodax[®]) and the remaining two are topical therapies (Valchlor[®] and Targretin[®]-gel). There are currently no FDA approved therapies for the treatment of front-line, early stage (I-IIA) CTCL; however certain topical chemotherapies and topical, radiation, photodynamic and other therapies which are approved for indications other than CTCL are prescribed off-label for the treatment of early stage CTCL. These include psoralen combined with ultraviolet A (UVA) light therapy ("PUVA"); however, PUVA treatments are usually limited to three times per week and 200 times in total due to the potentially carcinogenic side effect. There are other drugs currently in development that may have the potential to be used in early stage (I-IIA) CTCL – two topical therapies are in phase 2 (sirolimus and SHAPE gelled solution), one photodynamic therapy (Silicon Phthalocyanine 4) in Phase 1 and one systemic therapy for stage IB, II or III CTCL completing Phase 2 (cobomarsen). Other treatments for later stage disease are not considered direct competitors.

SGX94/942 Competition

Because SGX94 (dusquetide) uses a novel mechanism of action in combating bacterial infections, there are no direct competitors at this time. Bacterial infections are routinely treated with antibiotics and SGX94 treatment is anticipated to be utilized primarily where antibiotics are insufficient (e.g., due to antibiotic resistance) or contra-indicated (e.g., in situations where the development of antibiotic resistance is a significant concern). Many groups are working on the antibiotic resistance problem and research into the innate immune system is intensifying, making emerging competition likely (from companies such as Celtaxsys Inc., Innaxon Therapeutics and Innate Pharma SA).

There is currently one drug approved for the treatment of oral mucositis in hematological cancer (palifermin). There are currently no approved drugs for treatment of oral mucositis in cancers with solid tumors (e.g., head and neck cancer). There are several drugs in clinical development for oral mucositis – three in Phase 3 (an epidermal growth factor under development by Daewoong Pharmaceutical Co. Ltd. a protease inhibitor under investigation at a Chinese hospital, and daily infused GC4419 by Galera Therapeutics Inc.), four in Phase 2 (under development by Innovation Pharmaceuticals, Intrexon Corporation, Monopar Therapeutics LLC, Moberg Pharma) and various natural products in small and/or open label studies (including sage, turmeric, honey and olive oil). In addition, there are medical devices approved for the treatment of oral mucositis including MuGard, GelClair, Episil and Caphosol. These devices attempt to create a protective barrier around the oral ulceration with no biologic activity in treating the underlying disease.

Oral BDP Competition

There are a number of approved treatments for Crohn's disease and additional compounds are in late-stage development.

Remicade (infliximab) and Humira (adalimumab) are currently approved for the treatment of pediatric Crohn's disease; however, both carry significant Black Box warnings in their labeling for increased risk of serious infection and malignancy, and therefore are approved for treatment of moderate to severe patients. Entocort (enteric-coated budesonide) is currently approved for the treatment of mild to moderate active Crohn's disease involving the lower GI tract (ileum and/or the ascending colon) in patients eight years of age and older who weigh more than 25 kilograms. There is one other marketed biologic, Tysabri (natalizumab), in a Phase 2 study for pediatric Crohn's.

ThermoVax® Competition

Multiple groups and companies are working to address the unmet need of vaccine thermostability using a variety of technologies. In addition, other organizations, such as the Bill and Melinda Gates Foundation and PATH, have programs designed to advance technologies to address this need.

Several stabilization technologies currently being developed involve mixing vaccine antigen +/- adjuvant with various proprietary excipients or co-factors that either serve to stabilize the vaccine or biological product in a liquid or dried (lyophilized) form. Examples of these approaches include the use of various plant-derived sugars and macromolecules being developed by companies such as Stabilitech Ltd. Variation Biotechnologies, Inc. ("VBI") is developing a lipid system (resembling liposomes) to stabilize viral antigens, including virus-like particles ("VLPs"), and for potential application to a conventional influenza vaccine among others.

Other approaches involve process variations to freeze-dry live virus vaccines. For example, PaxVax, Inc. is seeking to employ a spray drying technology in concert with enteric coating to achieve formulations for room temperature stability of live virus vaccines using adenovirus vectors. VBI is seeking to utilize their proprietary stabilization technology for a number of vaccines (as a co-development service, similar to the business model being developed by Stabilitech Ltd.), whereas PaxVax is applying the technology to their own proprietary vaccine development programs. Stabilitech uses combinations of excipients, which include glassifying sugars similar to the ThermoVax® technology, and variations in drying cycles during lyophilization, as does the ThermoVax® technology.

Additionally, companies like Pharmathene, Inc., Panacea Biotec Ltd., and Compass Biotech Inc. are developing proprietary vaccines with the application of some form of stabilization technology.

Public Health Solutions Competition

We face competition in the area of biodefense product development from various public and private companies, universities and governmental agencies, such as the U.S. Army, some of whom may have their own proprietary technologies which may directly compete with our technologies.

The U.S. Army Medical Research Institute of Infectious Diseases, the DoD's lead laboratory for medical research to counter biological threats is also developing a ricin vaccine candidate, RVEc™. RVEc™ has been shown to be fully protective in mice exposed to lethal doses of ricin toxin by the aerosol route. Further studies, in both rabbits and nonhuman primates, were conducted to evaluate RVEc™'s safety as well as its immunogenicity, with positive results observed. A monoclonal antibody is also being developed by Mapp Biopharmaceutical Inc. as a ricin therapeutic, with administration 4 hours after exposure demonstrating efficacy while administration 12 hours after ricin exposure was not protective in animal models.

Patents and Other Proprietary Rights

Our goal is to obtain, maintain and enforce patent protection for our products, formulations, processes, methods and other proprietary technologies, preserve our trade secrets, and operate without infringing on the proprietary rights of other parties, both in the U.S. and in other countries. Our policy is to actively seek to obtain, where appropriate, the broadest intellectual property protection possible for our product candidates, proprietary information and proprietary technology through a combination of contractual arrangements and patents, both in the U.S. and elsewhere in the world.

We also depend upon the skills, knowledge and experience of our scientific and technical personnel, as well as that of our advisors, consultants and other contractors, none of which is patentable. To help protect our proprietary knowledge and experience that is not patentable, and for inventions for which patents may be difficult to enforce, we rely on trade secret protection and confidentiality agreements to protect our interests. To this end, we require all employees, consultants, advisors and other contractors to enter into confidentiality agreements, which prohibit the disclosure of confidential information and, where applicable, require disclosure and assignment to us of the ideas, developments, discoveries and inventions important to our business.

In 2014, we acquired a novel photodynamic therapy that utilizes safe visible light for activation, which we refer to as SGX301. The active ingredient in SGX301 is synthetic hypericin, a photosensitizer which is topically applied to skin lesions and then activated by fluorescent light 16 to 24 hours later. As part of the acquisition, we acquired a license agreement relating to the use of photo-activated hypericin, composition of matter patent for SGX301 (U.S. patent 8,629,302) and additional issued and pending applications, both in the U.S. and abroad. U.S. patent 8,629,302 is expected to expire in September 2030. In August 2018, we were granted a U.S. patent (No. 10,053,513) titled “Systems and Methods for Producing Synthetic Hypericin”. This newly issued patent, expected to expire in 2036, broadens the production around synthetic hypericin. Our proprietary formulation of synthetic hypericin also has been granted a European patent for the treatment of psoriasis, EP 2571507, and complements the method of treatment claims covered by the previously issued U.S. patent 6001882, Photoactivated hypericin and the use thereof. Further, on January 7, 2020, Soligenix was also granted a U.S. patent (No. 10,526,268) titled “Systems and Methods for Producing Synthetic Hypericin”, which further expanded protection for the composition of purified synthetic hypericin. This patent is also expected to expire in 2036.

In addition to issued and pending patents, we also have “Orphan Drug” designations for SGX301 in the U.S. and the EU for CTCL, SGX203 in the U.S. for pediatric Crohn’s disease, as well as for RiVax[®] in the U.S. and EU. Our Orphan Drug designations provide for seven years of post-approval marketing exclusivity in the U.S. and ten years exclusivity in Europe. We have pending patent applications for this indication that, if granted, may extend our anticipated marketing exclusivity beyond the U.S. seven year or EU. ten year post-approval exclusivity provided by Orphan Drug legislation.

In 2013, we expanded our patent portfolio to include innate defense regulation through the acquisition of the novel drug technology, known as SGX94. By binding to the pivotal regulatory protein p62, also known as sequestosome-1, SGX94 regulates the innate immune system to reduce inflammation, eliminate infection and enhance healing. As part of the acquisition, we acquired all rights, including composition of matter patents for SGX94 as well as other analogs and crystal structures of SGX94 with its protein target p62, including U.S. patent 8,124,721 and additional pending applications, both in the U.S. and abroad. SGX94 was developed pursuant to discoveries made by Professors B. Brett Finlay and Robert Hancock of University of British Columbia (“UBC”). U.S. patent 8,124,721 is expected to expire in April 2028. The U.S. Patent Office has granted the patent entitled “Novel Peptides and Analogs for Use in the Treatment of Oral Mucositis”. The newly issued patent claims therapeutic use of dusquetide and related IDR analogs, and adds to composition of matter claims for dusquetide and related analogs that have been granted in the U.S. and worldwide. In January 2019, the European Patent Office granted the patent entitled “Novel Peptides for Treating and Preventing Immune-Related Disorders, Including Treating and Preventing Infection by Modulating Innate Immunity”. This newly issued patent claims composition of matter of IDR analogs, expanding patent protection around our lead IDR, dusquetide. In 2019, we further expanded protection for dusquetide and related IDR analogs with patents granted in Canada (composition of matter) and in New Zealand and the U.S. (No. 10,526,268; protecting therapeutic use in oral mucositis).

We have issued U.S. patents 8,263,582 that cover the use of oral BDP for treating inflammatory disorders of the gastrointestinal tract, which patent is expected to expire in March 2022. We also have European patent EP 1392321 claiming the use of topically active corticosteroids in orally administered dosage forms that act concurrently to treat inflammation in the upper and lower gastrointestinal tract, as well as European patent EP 2242477 claiming the use of orally ingested BDP for treatment of interstitial lung disease. European patents EP 1392321 and EP 2242477 are expected to expire in March 2022 and January 2029.

The subject of U.S. patent application number 12/633,631 filed December 8, 2009 and continued into patent application 15/495,798 filed April 24, 2017 and corresponding European patent application number 09836727.9, which was granted as patent 2373160 in October 2017 and pursued in multiple European countries, is the use of topically active BDP in radiation and chemotherapeutics injury. Additionally, we have numerous patent filings currently issued or pending in foreign jurisdictions covering this subject matter, including Australia, Canada, China, Hong Kong, Israel, Japan, South Korea and New Zealand.

ThermoVax[®] is the subject of U.S. patent 8,444,991 issued on May 21, 2013 titled “Method of Preparing an Immunologically-Active Adjuvant-Bound Dried Vaccine Composition” and licensed to us by VitriVax, Inc. ThermoVax[®] is also U.S. patent application number 13/474,661 filed May 17, 2012 titled “Thermostable Vaccine Compositions and Methods of Preparing Same” and jointly invented by the UC and the Company. The patent application and the corresponding foreign filings are pending or granted and they address the use of adjuvants in conjunction with vaccines that are formulated to resist thermal inactivation. The license agreement covers thermostable vaccines for biodefense. U.S. patent 8,444,991 is expected to expire in February 2030. An additional patent, covering vaccine combinations such as ricin toxin and anthrax, was filed in 2015 and granted on May 21, 2019 in the U.S. (No. 10,293,041, titled “Multivalent Stable Vaccine Composition and Methods of Making Same”) and is expected to expire in 2035.

RiVax[®] is the subject of three issued U.S. patent numbers 6,566,500, 6,960,652, and 7,829,668, all titled “Compositions and methods for modifying toxic effects of proteinaceous compounds.” This patent family includes composition of matter claims for the modified ricin toxin A chain which is the immunogen contained in RiVax[®], and issued in 2003, 2005 and 2010 respectively. The initial filing date of these patents is March 2000 and they will expire on March 30, 2020. The issued patents contain claims that describe alteration of sequences within the ricin A chain that affect vascular leak, one of the deadly toxicities caused by ricin toxin. Another U.S. patent number 7,175,848 titled “Ricin A chain mutants lacking enzymatic activity as vaccines to protect against aerosolized ricin,” was filed in October of 2000 and is expected to expire in September 2020.

SGX301 License Agreement

In September 2014, we acquired a worldwide exclusive license agreement with New York University and Yeda Research and Development Company Ltd. for the rights to a novel photodynamic therapy that utilizes safe visible light for activation, which we refer to as SGX301. To maintain this license we are obligated to pay \$25,000 in annual license fees. In addition, we will pay the licensors: (a) a royalty amount equal to 3% of all net sales of SGX301 made directly by us and/or any affiliates; (b) a royalty amount equal to 2.5% of all net sales of SGX301 made by our sublicensees, subject to stated maximums and (c) 20% of all payments, not based on net sales, received by us from our sublicensees. This license may be terminated by either party upon notice of a material breach by the other party that is not cured within the applicable cure period. The exclusive license includes rights to several issued U.S. patents, including U.S. patent numbers 6,867,235 and 7,122,518, among other domestic and foreign patent applications. U.S. Patent numbers 6,867,235 and 7,122,518 are expected to expire in January 2020 and November 2023, respectively.

We acquired the license agreement for SGX301 and related intangible assets, including U.S. patent 8,629,302, properties and rights pursuant to an asset purchase agreement with Hy Biopharma Inc. (“Hy Biopharma”). As consideration for the assets acquired, we initially paid \$275,000 in cash and issued 184,912 shares of common stock with a market value of \$3,750,000, and in March 2020 we issued 1,956,182 shares of common stock at a value of \$5,000,000 (based upon an effective per share price of \$2.56) as a result of SGX301 demonstrating statistical significant treatment response in the Phase 3 clinical trial. Provided the final success-orientated milestone is attained, we will be required to make a payment of up to \$5.0 million, if and when achieved, payable in our common stock.

SGX94 License Agreements

On December 18, 2012, we announced the acquisition of a first in class drug technology, known as SGX94 (dusquetide), representing a novel approach to modulation of the innate immune system. SGX94 is an IDR that regulates the innate immune system to reduce inflammation, eliminate infection and enhance tissue healing by binding to the pivotal regulatory protein p62, also known as sequestosome-1. As part of the acquisition, we acquired all rights, including composition of matter patents, preclinical and Phase 1 clinical study datasets for SGX94. We also assumed a license agreement with UBC to advance the research and development of the SGX94 technology. The license agreement with UBC provides us with exclusive worldwide rights to manufacture, distribute, market sell and/or license or sublicense products derived or developed from this technology. Under the license agreement we are obligated to pay UBC (i) an annual license maintenance fee of CAN \$1,000, and (ii) milestone payments which could reach up to CAN \$1.2 million. This license agreement (a) will automatically terminate if we file, or become subject to an involuntary filing, for bankruptcy, and (b) may be terminated by UBC in the event of, among other things, our insolvency, dissolution, grant of a security interest in the technology licensed to us pursuant to the license agreement, or material breach of or failure to perform material obligations under the license agreement or other research agreements between us and UBC.

Oral BDP License Agreement

On November 24, 1998, the Company, known at the time as Enteron Pharmaceuticals, Inc. (“Enteron”) and George B. McDonald (“Dr. McDonald”) entered into an exclusive license agreement for the rights to intellectual property, including know-how, relating to oral BDP. We have an exclusive license to commercially exploit the covered products worldwide, subject to Dr. McDonald’s right to make and use the technology for research purposes and the U.S. Government’s right to use the technology for government purposes. Pursuant to the license agreement, as amended, we are required to (i) reimburse Dr. McDonald for certain out-of-pocket expenses incurred by Dr. McDonald in connection with the patent applications and issued patents, (ii) pay Dr. McDonald \$300,000 upon approval by the FDA of our first NDA incorporating oral BDP; (iii) pay Dr. McDonald royalty payments equal to 3% of net sales of the covered products and (iv) pay Dr. McDonald \$400,000 in cash upon an approval of oral BDP by the European Medicines Agency.

Additionally, in the event that sublicensees our rights under the license agreement, we will be required to pay Dr. McDonald 10% of any sublicense fees and royalty payments paid by the sublicense to us.

The term of the license agreement expires upon the expiration of the licensed patent applications or patents. Dr. McDonald has the right to terminate the license agreement in its entirety or to terminate exclusivity under the agreement if we or its sublicensees have not commercialized or are not actively attempting to commercialize a covered product.

Additionally, the agreement terminates: (i) automatically upon us becoming insolvent; (ii) upon 30 days’ notice, if we breach any obligation under the agreement without curing such breach during the notice period; and (iii) upon 90 days’ notice by us. After any termination, we will have the right to sell our inventory for a period not to exceed three months following the date of termination, subject to the payment of the amounts owed under the agreement.

ThermoVax® License Agreement

On December 21, 2010, we executed a worldwide exclusive license agreement with the UC for ThermoVax®, which is the subject of U.S. patent number 8,444,991 issued on May 21, 2013 titled “Method of Preparing an Immunologically-Active Adjuvant-Bound Dried Vaccine Composition.” This patent and its corresponding foreign filings are licensed to us by the UC and they address the use of adjuvants in conjunction with vaccines that are formulated to resist thermal inactivation. U.S. Patent 8,444,991 is expected to expire in December 2031. The license agreement also covers thermostable vaccines for biodefense as well as other potential vaccine indications. In addition, we, in conjunction with UC, filed domestic and foreign patent applications claiming priority back to a provisional application filed on May 17, 2011 titled: “Thermostable Vaccine Compositions and Methods of Preparing Same.” In April 2018, the UC delivered a notice of termination of our license agreement based upon our failure to achieve one of the development milestones: initiation of the Phase 1 clinical trial of the heat stabilization technology by March 31, 2018. After negotiating with the UC, we and the UC agreed to extend the termination date to October 31, 2018 in order to allow us time to agree upon a potential agreement that would allow us to keep the rights to, and to continue to develop, the heat stabilization technology or a product candidate containing the heat stabilization technology in our field of use.

On October 31, 2018, in a series of related transactions, (a) we and the UC agreed to terminate the original license agreement, (b) the UC and VitriVax executed a worldwide exclusive license agreement for the heat stabilization technology for all fields of use, and (c) we and VitriVax executed a worldwide exclusive sublicense agreement for the heat stabilization technology for use in the fields of ricin and Ebola vaccines. We paid a \$100,000 sublicense fee on the effective date of the sublicense agreement. To maintain the sublicense we are obliged to pay a minimum annual royalty of \$20,000 until first commercial sale of a sublicensed product, upon which point, we will be required to pay an earned royalty of 2% of net sales subject to a minimum royalty of \$50,000 each year. We are also required to pay royalties on any sub-sublicense income based on a declining percentage of all sub-sublicense income calculated within the contractual period until reaching a minimum of 15% after two years. In addition, we are required to pay VitriVax milestone fees of: (a) \$50,000 upon initiation of a Phase II clinical trial of the sublicensed product, (b) \$200,000 upon regulatory approval of a sublicensed product, and (c) \$1 million upon achieving \$10 million in aggregate net sales of a sublicensed product in the U.S. or equivalent. To date none of these milestones have been met.

RiVax[®] License Agreement

In June 2003, we executed a worldwide exclusive option to license patent applications with UTSW for the nasal, pulmonary and oral uses of a non-toxic ricin vaccine. In June 2004, we entered into a license agreement with UTSW for the injectable rights to the ricin vaccine and, in October 2004, we negotiated the remaining oral rights to the ricin vaccine. To maintain this license we are obligated to pay \$50,000 in annual license fees. Through this license, we have rights to the issued patent number 7,175,848 titled “Ricin A chain mutants lacking enzymatic activity as vaccines to protect against aerosolized ricin.” This patent includes methods of use and composition claims for RiVax[®].

Research and Development Expenditures

We spent approximately \$8.1 million and \$6.8 million in the years ended December 31, 2019 and 2018, respectively, on research and development. The amounts we spent on research and development per product during the years ended December 31, 2019, and 2018 are set forth in “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in this Annual Report on Form 10-K.

Employees

As of December 31, 2019, we employed a total of 16 persons, including 1 part-time employees and 15 full-time employees, six of whom are MDs/PhDs. None of our employees are a party to a collective bargaining agreement. We consider our relationships with our employees to be good.

Available Investor Information

We file electronically with the Securities and Exchange Commission (“SEC”) our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) of 15(d) of the Securities Exchange Act of 1934, as amended (the “Exchange Act”). We make available through our website, free of charge, copies of these reports as soon as reasonably practicable after we electronically file or furnish them to the SEC. Our website is located at www.soligenix.com. You can also request copies of such documents by contacting the company at (609) 538-8200 or sending an email to info@soligenix.com.

Item 1A. Risk factors

An investment in our securities involves a high degree of risk. You should carefully consider the following information about these risks, together with the other information about these risks contained in this Annual Report, as well as the other information contained in this Annual Report generally, before deciding to buy our securities. Any of the risks we describe below could adversely affect our business, financial condition, operating results or prospects. The market prices for our securities could decline if one or more of these risks and uncertainties develop into actual events and you could lose all or part of your investment. Additional risks and uncertainties that we do not yet know of, or that we currently think are immaterial, may also impair our business operations. You should also refer to the other information contained in this Annual Report, including our financial statements and the related notes.

Risks Related to our Business

We have had significant losses and anticipate future losses; if additional funding cannot be obtained, we may reduce or discontinue our product development and commercialization efforts.

We have experienced significant losses since inception and, at December 31, 2019, had an accumulated deficit of approximately \$176 million. We expect to incur additional operating losses in the future and expect our cumulative losses to increase. As of December 31, 2019, we had approximately \$5.4 million in cash and cash equivalents available. Based on our projected budgetary needs, funding from existing contracts and grants over the next two years and sales pursuant to our At the Market Issuance Sales Agreement (“FBR Sales Agreement”) with B. Riley FBR, Inc. (“FBR”), we expect to be able to maintain the current level of our operations through at least March 31, 2021.

In September 2014, we entered into a contract with the NIH for the development of RiVax[®] to protect against exposure to ricin toxin that would provide up to \$24.7 million of funding in the aggregate over six years if options to extend the contract are exercised by the NIH. In September 2013, we entered into contracts with NIAID and BARDA for the development of OrbeShield[®] (oral BDP) that would provide up to \$32.7 million of funding in the aggregate if options to extend the contracts are exercised by BARDA and the NIH. We have received approximately \$18 million in combined BARDA and NIH contract funding for the development of OrbeShield[®] (oral BDP). We have completed the contract with NIAID and the BARDA contract base period, with BARDA electing not to extend the contract. In addition, in 2017, we were awarded two separate grants from the NIH of approximately \$1.5 million each to support our pivotal Phase 3 trials of SGX301 for the treatment of CTCL and SGX942 for the treatment of oral mucositis in head and neck cancer. Our biodefense grants have an overhead component that allows us an agency-approved percentage over our incurred costs. We estimate that the overhead component associated with our existing contracts and grants will fund some fixed costs for direct employees working on these contracts and grants as well as other administrative costs. As of December 31, 2019, we have approximately \$2.97 million in awarded contract and grant funding available.

Our product candidates are positioned for or are currently in clinical trials, and we have not yet generated any significant revenues from sales or licensing of these product candidates. From inception through December 31, 2019, we have expended approximately \$88 million developing our current product candidates for pre-clinical research and development and clinical trials, and we currently expect to spend approximately \$9.4 million for the year ending December 31, 2020 in connection with the development of our therapeutic and vaccine products, licenses, employment agreements, and consulting agreements, of which approximately \$2.97 million is expected to be reimbursed through our existing government contracts and grants.

We have no control over the resources and funding NIH, BARDA and NIAID may devote to our programs, which may be subject to periodic renewal and which generally may be terminated by the government at any time for convenience. Any significant reductions in the funding of U.S. government agencies or in the funding areas targeted by our business could materially and adversely affect our biodefense program and our results of operations and financial condition. If we fail to satisfy our obligations under the government contracts, the applicable Federal Acquisition Regulations allow the government to terminate the agreement in whole or in part, and we may be required to perform corrective actions, including but not limited to delivering to the government any incomplete work. If NIH, BARDA or NIAID do not exercise future funding options under the contracts or grants, terminate the funding or fail to perform their responsibilities under the agreements or grants, it could materially impact our biodefense program and our financial results.

Unless and until we are able to generate sales or licensing revenue from one of our product candidates, we will require additional funding to meet these commitments, sustain our research and development efforts, provide for future clinical trials, and continue our operations. There can be no assurance we can raise such funds. If additional funds are raised through the issuance of equity securities, stockholders may experience dilution of their ownership interests, and the newly issued securities may have rights superior to those of the common stock. If additional funds are raised by the issuance of debt, we may be subject to limitations on our operations. If we cannot raise such additional funds, we may have to delay or stop some or all of our drug development programs.

If we are unable to develop our product candidates, our ability to generate revenues and viability as a company will be significantly impaired.

In order to generate revenues and profits, our organization must, along with corporate partners and collaborators, positively research, develop and commercialize our technologies or product candidates. Our current product candidates are in various stages of clinical and pre-clinical development and will require significant further funding, research, development, pre-clinical and/or clinical testing, regulatory approval and commercialization, and are subject to the risks of failure inherent in the development of products based on innovative or novel technologies. Specifically, each of the following is possible with respect to any of our product candidates:

- we may not be able to maintain our current research and development schedules;
- we may be unable to secure procurement contracts on beneficial economic terms or at all from the U.S. government or others for our biodefense products;
- we may encounter problems in clinical trials; or
- the technology or product may be found to be ineffective or unsafe, or may fail to obtain marketing approval.

If any of the risks set forth above occur, or if we are unable to obtain the necessary regulatory approvals as discussed below, we may be unable to develop our technologies and product candidates and our business will be seriously harmed. Furthermore, for reasons including those set forth below, we may be unable to commercialize or receive royalties from the sale of any other technology we develop, even if it is shown to be effective, if:

- it is not economical or the market for the product does not develop or diminishes;
- we are not able to enter into arrangements or collaborations to manufacture and/or market the product;
- the product is not eligible for third-party reimbursement from government or private insurers;
- others hold proprietary rights that preclude us from commercializing the product;
- we are not able to manufacture the product reliably;
- others have brought to market similar or superior products; or
- the product has undesirable or unintended side effects that prevent or limit its commercial use.

We expect a number of factors to cause our operating results to fluctuate on a quarterly and annual basis, which may make it difficult to predict our future performance.

We are a late-stage biopharmaceutical company. Our operations to date have been primarily limited to developing our technology and undertaking pre-clinical studies and clinical trials of our product candidates in our two active business segments, Specialized BioTherapeutics and Public Health Solutions. We have not yet obtained regulatory approvals for any of our product candidates. Consequently, any predictions made about our future success or viability may not be as accurate as they could be if we had commercialized products. Our financial condition has varied significantly in the past and will continue to fluctuate from quarter-to-quarter or year-to-year due to a variety of factors, many of which are beyond our control. Factors relating to our business that may contribute to these fluctuations include other factors described elsewhere in this Annual Report and also include:

- our ability to obtain additional funding to develop our product candidates;
- delays in the commencement, enrollment and timing of clinical trials;
- the success of our product candidates through all phases of clinical development;
- any delays in regulatory review and approval of product candidates in clinical development;
- our ability to obtain and maintain regulatory approval for our product candidates in the U.S. and foreign jurisdictions;

- potential side effects of our product candidates that could delay or prevent commercialization, limit the indications for any approved drug, require the establishment of risk evaluation and mitigation strategies, or cause an approved drug to be taken off the market;
- our dependence on third-party contract manufacturing organizations to supply or manufacture our products;
- our dependence on contract research organizations to conduct our clinical trials;
- our ability to establish or maintain collaborations, licensing or other arrangements;
- market acceptance of our product candidates;
- our ability to establish and maintain an effective sales and marketing infrastructure, either through the creation of a commercial infrastructure or through strategic collaborations;
- competition from existing products or new products that may emerge;
- the ability of patients or healthcare providers to obtain coverage of or sufficient reimbursement for our products;
- our ability to discover and develop additional product candidates;
- our ability and our licensors' abilities to successfully obtain, maintain, defend and enforce intellectual property rights important to our business;
- our ability to attract and retain key personnel to manage our business effectively;
- our ability to build our finance infrastructure and improve our accounting systems and controls;
- potential product liability claims;
- potential liabilities associated with hazardous materials; and
- our ability to obtain and maintain adequate insurance policies.

Accordingly, the results of any quarterly or annual periods should not be relied upon as indications of future operating performance.

We have no approved products on the market and therefore do not expect to generate any revenues from product sales in the foreseeable future, if at all.

To date, we have no approved product on the market and have not generated any significant product revenues. We have funded our operations primarily from sales of our securities and from government contracts and grants. We have not received, and do not expect to receive for at least the next several years, if at all, any revenues from the commercialization of our product candidates. To obtain revenues from sales of our product candidates, we must succeed, either alone or with third parties, in developing, obtaining regulatory approval for, manufacturing and marketing drugs with commercial potential or successfully obtain government procurement or stockpiling agreements. We may never succeed in these activities, and we may not generate sufficient revenues to continue our business operations or achieve profitability.

Our business is subject to extensive governmental regulation, which can be costly, time consuming and subjects us to unanticipated delays.

Our business is subject to very stringent federal, foreign, state and local government laws and regulations, including the Federal Food, Drug and Cosmetic Act, the Environmental Protection Act, the Occupational Safety and Health Act, and state and local counterparts to these acts. These laws and regulations may be amended, additional laws and regulations may be enacted, and the policies of the FDA and other regulatory agencies may change.

The regulatory process applicable to our products requires pre-clinical and clinical testing of any product to establish its safety and efficacy. This testing can take many years, is uncertain as to outcome, and requires the expenditure of substantial capital and other resources. We estimate that the clinical trials of our product candidates that we have planned will take at least several years to complete. Furthermore, failure can occur at any stage of the trials, and we could encounter problems that cause us to abandon or repeat clinical trials. Favorable results in early studies or trials, if any, may not be repeated in later studies or trials. Even if our clinical trials are initiated and completed as planned, we cannot be certain that the results will support our product candidate claims. Success in preclinical testing, Phase 1 and Phase 2 clinical trials does not ensure that later Phase 2 or Phase 3 clinical trials will be successful. In addition, we, the FDA or other regulatory authorities may suspend clinical trials at any time if it appears that we are exposing participants to unacceptable health risks or the FDA or other regulatory authorities find deficiencies in our submissions or conduct of our trials.

We may not be able to obtain, or we may experience difficulties and delays in obtaining, necessary domestic and foreign governmental clearances and approvals to market a product. Also, even if regulatory approval of a product is granted, that approval may entail limitations on the indicated uses for which the product may be marketed.

Following any regulatory approval, a marketed product and its manufacturer are subject to continual regulatory review. Later discovery of problems with a product or manufacturer may result in restrictions on such product or manufacturer. These restrictions may include product recalls and suspension or withdrawal of the marketing approval for the product. Furthermore, the advertising, promotion and export, among other things, of a product are subject to extensive regulation by governmental authorities in the U.S. and other countries. If we fail to comply with applicable regulatory requirements, we may be subject to fines, suspension or withdrawal of regulatory approvals, product recalls, seizure of products, operating restrictions and/or criminal prosecution.

There may be unforeseen challenges in developing our biodefense products.

For development of biodefense vaccines and therapeutics, the FDA has instituted policies that are expected to result in accelerated approval. This includes approval for commercial use using the results of animal efficacy trials, rather than efficacy trials in humans, referred to as the Animal Rule. However, we will still have to establish that the vaccines we are developing are safe in humans at doses that are correlated with the beneficial effect in animals. Such clinical trials will also have to be completed in distinct populations that are subject to the countermeasures; for instance, the very young and the very old, and in pregnant women, if the countermeasure is to be licensed for civilian use. Other agencies will have an influence over the risk benefit scenarios for deploying the countermeasures and in establishing the number of doses utilized in the Strategic National Stockpile. We may not be able to sufficiently demonstrate the animal correlation to the satisfaction of the FDA, as these correlates are difficult to establish and are often unclear. Invocation of the Animal Rule may raise issues of confidence in the model systems even if the models have been validated. For many of the biological threats, the animal models are not available and we may have to develop the animal models, a time-consuming research effort. There are few historical precedents, or recent precedents, for the development of new countermeasures for bioterrorism agents. Despite the Animal Rule, the FDA may require large clinical trials to establish safety and immunogenicity before licensure and it may require safety and immunogenicity trials in additional populations. Approval of biodefense products may be subject to post-marketing studies, and could be restricted in use in only certain populations. The government's biodefense priorities can change, which could adversely affect the commercial opportunity for the products we are developing. Further, other countries have not, at this time, established criteria for review and approval of these types of products outside their normal review process, i.e., there is no Animal Rule equivalent, and consequently there can be no assurance that we will be able to make a submission for marketing approval in foreign countries based on such animal data.

Additionally, few facilities in the U.S. and internationally have the capability to test animals with ricin, or otherwise assist us in qualifying the requisite animal models. We have to compete with other biodefense companies for access to this limited pool of highly specialized resources. We therefore may not be able to secure contracts to conduct the testing in a predictable timeframe or at all.

We are dependent on government funding, which is inherently uncertain, for the success of our biodefense operations.

We are subject to risks specifically associated with operating in the biodefense industry, which is a new and unproven business area. We do not anticipate that a significant commercial market will develop for our biodefense products. Because we anticipate that the principal potential purchasers of these products, as well as potential sources of research and development funds, will be the U.S. government and governmental agencies, the success of our biodefense division will be dependent in large part upon government spending decisions. The funding of government programs is dependent on budgetary limitations, congressional appropriations and administrative allotment of funds, all of which are inherently uncertain and may be affected by changes in U.S. government policies resulting from various political and military developments. Our receipt of government funding is also dependent on our ability to adhere to the terms and provisions of the original grant and contract documents and other regulations. We can provide no assurance that we will receive or continue to receive funding for grants and contracts we have been awarded. The loss of government funds could have a material adverse effect on our ability to progress our biodefense business.

If the parties we depend on for supplying our drug substance raw materials and certain manufacturing-related services do not timely supply these products and services, it may delay or impair our ability to develop, manufacture and market our products. We do not have or anticipate having internal manufacturing capabilities.

We rely on suppliers for our drug substance raw materials and third parties for certain manufacturing-related services to produce material that meets appropriate content, quality and stability standards, which material will be used in clinical trials of our products and, after approval, for commercial distribution. To succeed, clinical trials require adequate supplies of drug substance and drug product, which may be difficult or uneconomical to procure or manufacture. We and our suppliers and vendors may not be able to (i) produce our drug substance or drug product to appropriate standards for use in clinical studies, (ii) perform under any definitive manufacturing, supply or service agreements with us or (iii) remain in business for a sufficient time to be able to develop, produce, secure regulatory approval of and market our product candidates. If we do not maintain important manufacturing and service relationships, we may fail to find a replacement supplier or required vendor or develop our own manufacturing capabilities which could delay or impair our ability to obtain regulatory approval for our products and substantially increase our costs or deplete profit margins, if any. If we do find replacement manufacturers and vendors, we may not be able to enter into agreements with them on terms and conditions favorable to us and, there could be a substantial delay before a new facility could be qualified and registered with the FDA and foreign regulatory authorities.

We rely on third parties for pre-clinical and clinical trials of our product candidates and, in some cases, to maintain regulatory files for our product candidates. If we are not able to maintain or secure agreements with such third parties on acceptable terms, if these third parties do not perform their services as required, or if these third parties fail to timely transfer any regulatory information held by them to us, we may not be able to obtain regulatory approval for, or commercialize, our product candidates.

We rely on academic institutions, hospitals, clinics and other third-party collaborators for preclinical and clinical trials of our product candidates. Although we monitor, support, and/or oversee our pre-clinical and clinical trials, because we do not conduct these trials ourselves, we have less control over the timing and cost of these studies and the ability to recruit trial subjects than if we conducted these trials wholly by ourselves. If we are unable to maintain or enter into agreements with these third parties on acceptable terms, or if any such engagement is terminated, we may be unable to enroll patients on a timely basis or otherwise conduct our trials in the manner we anticipate. In addition, there is no guarantee that these third parties will devote adequate time and resources to our studies or perform as required by a contract or in accordance with regulatory requirements, including maintenance of clinical trial information regarding our product candidates. If these third parties fail to meet expected deadlines, fail to timely transfer to us any regulatory information, fail to adhere to protocols or fail to act in accordance with regulatory requirements or our agreements with them, or if they otherwise perform in a substandard manner or in a way that compromises the quality or accuracy of their activities or the data they obtain, then preclinical and/or clinical trials of our product candidates may be extended, delayed or terminated, or our data may be rejected by the FDA or regulatory agencies.

The manufacturing of our products is a highly exacting process, and if we or one of our materials suppliers encounter problems manufacturing our products, our business could suffer.

The FDA and foreign regulators require manufacturers to register manufacturing facilities. The FDA and foreign regulators also inspect these facilities to confirm compliance with current Good Manufacturing Practice (“cGMP”) or similar requirements that the FDA or foreign regulators establish. We, or our materials suppliers, may face manufacturing or quality control problems causing product production and shipment delays or a situation where we or the supplier may not be able to maintain compliance with the FDA’s cGMP requirements, or those of foreign regulators, necessary to continue manufacturing our drug substance. Any failure to comply with cGMP requirements or other FDA or foreign regulatory requirements could adversely affect our clinical research activities and our ability to market and develop our products.

We may use our financial and human resources to pursue a particular research program or product candidate and fail to capitalize on programs or product candidates that may be more profitable or for which there is a greater likelihood of success.

Because we have limited financial and human resources, we are currently focusing on the regulatory approval of certain product candidates. As a result, we may forego or delay pursuit of opportunities with other product candidates or for other indications that later prove to have greater commercial potential. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities. Our spending on existing and future product candidates for specific indications may not yield any commercially viable products. If we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through strategic alliance, licensing or other royalty arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate, or we may allocate internal resources to a product candidate in an area in which it would have been more advantageous to enter into a partnering arrangement.

Even if approved, our products will be subject to extensive post-approval regulation.

Once a product is approved, numerous post-approval requirements apply. Among other things, the holder of an approved NDA is subject to periodic and other FDA monitoring and reporting obligations, including obligations to monitor and report adverse events and instances of the failure of a product to meet the specifications in the NDA. Application holders must submit new or supplemental applications and obtain FDA approval for certain changes to the approved product, product labeling, or manufacturing process. Application holders must also submit advertising and other promotional material to the FDA and report on ongoing clinical trials.

Depending on the circumstances, failure to meet these post-approval requirements can result in criminal prosecution, fines, injunctions, recall or seizure of products, total or partial suspension of production, denial or withdrawal of pre-marketing product approvals, or refusal to allow us to enter into supply contracts, including government contracts. In addition, even if we comply with FDA and other requirements, new information regarding the safety or effectiveness of a product could lead the FDA to modify or withdraw product approval.

Even if we obtain regulatory approval to market our product candidates, our product candidates may not be accepted by the market.

Even if the FDA approves one or more of our product candidates, physicians and patients may not accept it or use it. Even if physicians and patients would like to use our products, our products may not gain market acceptance among healthcare payors such as managed care formularies, insurance companies or government programs such as Medicare or Medicaid. Acceptance and use of our products will depend upon a number of factors including: perceptions by members of the health care community, including physicians, about the safety and effectiveness of our drug product; cost-effectiveness of our product relative to competing products; availability of reimbursement for our product from government or other healthcare payers; and effectiveness of marketing and distribution efforts by us and our licensees and distributors, if any.

The degree of market acceptance of any product that we develop will depend on a number of factors, including:

- cost-effectiveness;
- the safety and effectiveness of our products, including any significant potential side effects, as compared to alternative products or treatment methods;
- the timing of market entry as compared to competitive products;
- the rate of adoption of our products by doctors and nurses;
- product labeling or product insert required by the FDA for each of our products;
- reimbursement policies of government and third-party payors;
- effectiveness of our sales, marketing and distribution capabilities and the effectiveness of such capabilities of our collaborative partners, if any; and
- unfavorable publicity concerning our products or any similar products.

Our product candidates, if successfully developed, will compete with a number of products manufactured and marketed by major pharmaceutical companies, biotechnology companies and manufacturers of generic drugs. Our products may also compete with new products currently under development by others. Physicians, patients, third-party payors and the medical community may not accept and utilize any of our product candidates. If our products do not achieve market acceptance, we will not be able to generate significant revenues or become profitable.

Because we expect sales of our current product candidates, if approved, to generate substantially all of our product revenues for the foreseeable future, the failure of these products to find market acceptance would harm our business and could require us to seek additional financing.

We do not have extensive sales and marketing experience and our lack of experience may restrict our success in commercializing some of our product candidates.

We do not have extensive experience in marketing or selling pharmaceutical products whether in the U.S. or internationally. To obtain the expertise necessary to successfully market and sell any of our products, the development of our own commercial infrastructure and/or collaborative commercial arrangements and partnerships will be required. Our ability to make that investment and also execute our current operating plan is dependent on numerous factors, including, the performance of third party collaborators with whom we may contract.

Our products, if approved, may not be commercially viable due to change in health care practice and third party reimbursement limitations.

Initiatives to reduce the federal deficit and to change health care delivery are increasing cost-containment efforts. We anticipate that Congress, state legislatures and the private sector will continue to review and assess alternative benefits, controls on health care spending through limitations on the growth of private health insurance premiums and Medicare and Medicaid spending, price controls on pharmaceuticals, and other fundamental changes to the health care delivery system. Any changes of this type could negatively impact the commercial viability of our products, if approved. Our ability to successfully commercialize our product candidates, if they are approved, will depend in part on the extent to which appropriate reimbursement codes and authorized cost reimbursement levels of these products and related treatment are obtained from governmental authorities, private health insurers and other organizations, such as health maintenance organizations. In the absence of national Medicare coverage determination, local contractors that administer the Medicare program may make their own coverage decisions. Any of our product candidates, if approved and when commercially available, may not be included within the then current Medicare coverage determination or the coverage determination of state Medicaid programs, private insurance companies or other health care providers. In addition, third-party payers are increasingly challenging the necessity and prices charged for medical products, treatments and services.

Our product candidates may cause serious adverse events or undesirable side effects which may delay or prevent marketing approval, or, if approval is received, require them to be taken off the market, require them to include safety warnings or otherwise limit their sales.

Serious adverse events or undesirable side effects from any of our product candidates could arise either during clinical development or, if approved, after the approved product has been marketed. The results of future clinical trials may show that our product candidates cause serious adverse events or undesirable side effects, which could interrupt, delay or halt clinical trials, resulting in delay of, or failure to obtain, marketing approval from the FDA and other regulatory authorities.

If any of our product candidates cause serious adverse events or undesirable side effects:

- regulatory authorities may impose a clinical hold which could result in substantial delays and adversely impact our ability to continue development of the product;
- regulatory authorities may require the addition of labeling statements, specific warnings, a contraindication or field alerts to physicians and pharmacies;
- we may be required to change the way the product is administered, conduct additional clinical trials or change the labeling of the product;
- we may be required to implement a risk minimization action plan, which could result in substantial cost increases and have a negative impact on our ability to commercialize the product;
- we may be required to limit the patients who can receive the product;
- we may be subject to limitations on how we promote the product;
- sales of the product may decrease significantly;
- regulatory authorities may require us to take our approved product off the market;
- we may be subject to litigation or product liability claims; and
- our reputation may suffer.

Any of these events could prevent us from achieving or maintaining market acceptance of the affected product or could substantially increase commercialization costs and expenses, which in turn could delay or prevent us from generating significant revenues from the sale of our products.

If we fail to obtain or maintain orphan drug exclusivity for our product candidates, our competitors may sell products to treat the same conditions and our revenue will be reduced.

Under the Orphan Drug Act, the FDA may designate a product as an orphan drug if it is intended to treat a rare disease or condition, defined as a patient population of fewer than 200,000 in the U.S., or a patient population greater than 200,000 in the U.S. where there is no reasonable expectation that the cost of developing the drug will be recovered from sales in the U.S. In the EU, the European Medicines Agency's Committee for Orphan Medicinal Products grants orphan drug designation to promote the development of products that are intended for the diagnosis, prevention, or treatment of a life-threatening or chronically debilitating condition affecting not more than five in 10,000 persons in the EU. Additionally, designation is granted for products intended for the diagnosis, prevention, or treatment of a life-threatening, seriously debilitating or serious and chronic condition when, without incentives, it is unlikely that sales of the drug in the EU would be sufficient to justify the necessary investment in developing the drug or biological product or where there is no satisfactory method of diagnosis, prevention, or treatment, or, if such a method exists, the medicine must be of significant benefit to those affected by the condition.

In the U.S., orphan drug designation entitles a party to financial incentives such as opportunities for grant funding towards clinical trial costs, tax advantages, and user-fee waivers. In addition, if a product receives the first FDA approval for the indication for which it has orphan designation, the product is entitled to orphan drug exclusivity, which means the FDA may not approve any other application to market the same drug for the same indication for a period of seven years, except in limited circumstances, such as a showing of clinical superiority over the product with orphan exclusivity or where the manufacturer is unable to assure sufficient product quantity. In the EU, orphan drug designation entitles a party to financial incentives such as reduction of fees or fee waivers and ten years of market exclusivity following drug or biological product approval. This period may be reduced to six years if the orphan drug designation criteria are no longer met, including where it is shown that the product is sufficiently profitable not to justify maintenance of market exclusivity.

Even though we have orphan drug designation for SGX301 in the U.S. and Europe, and SGX203, RiVax® in the U.S., we may not be the first to obtain marketing approval for any particular orphan indication due to the uncertainties associated with developing drugs or biologic products. Further, even if we obtain orphan drug exclusivity for a product, that exclusivity may not effectively protect the product from competition because different drugs with different active moieties can be approved for the same condition. Absent patent or other intellectual property protection, even after an orphan drug is approved, the FDA or European Medicines Agency may subsequently approve the same drug with the same active moiety for the same condition if the FDA or European Medicines Agency concludes that the later drug is safer, more effective, or makes a major contribution to patient care.

Federal and/or state health care reform initiatives could negatively affect our business.

The availability of reimbursement by governmental and other third-party payers affects the market for any pharmaceutical product. These third-party payers continually attempt to contain or reduce the costs of healthcare. There have been a number of legislative and regulatory proposals to change the healthcare system and further proposals are likely. Medicare's policies may decrease the market for our products. Significant uncertainty exists with respect to the reimbursement status of newly approved healthcare products.

Third-party payers are increasingly challenging the price and cost-effectiveness of medical products and services. Once approved, we might not be able to sell our products profitably or recoup the value of our investment in product development if reimbursement is unavailable or limited in scope, particularly for product candidates addressing small patient populations. On July 15, 2008, the Medicare Improvements for Patients and Providers Act of 2008 became law with a number of Medicare and Medicaid reforms to establish a bundled Medicare payment rate that includes services and drug/labs that were separately billed at that time. Bundling initiatives that have been implemented in other healthcare settings have occasionally resulted in lower utilization of services that had not previously been a part of the bundled payment.

In addition, in some foreign countries, the proposed pricing for a drug must be approved before it may be lawfully marketed. The requirements governing drug pricing vary widely from country to country. We expect that there will continue to be a number of U.S. federal and state proposals to implement governmental pricing controls. While we cannot predict whether such legislative or regulatory proposals will be adopted, the adoption of such proposals could have a material adverse effect on our business, financial condition and profitability.

We may not be able to retain rights licensed to us by third parties to commercialize key products or to develop the third party relationships we need to develop, manufacture and market our products.

We currently rely on license agreements from New York University, Yeda Research and Development Company Ltd., the University of Texas Southwestern Medical Center, the University of British Columbia, Harvard University and George B. McDonald, MD as well as sublicense agreement from VitriVax for the rights to commercialize key product candidates. We may not be able to retain the rights granted under these agreements or negotiate additional agreements on reasonable terms, if at all. Our existing license agreements impose, and we expect that future license agreements will impose, various diligence, milestone payment, royalty, and other obligations on us. If we fail to comply with our obligations under these agreements, or we are subject to a bankruptcy, we may be required to make certain payments to the licensor, we may lose the exclusivity of our license, or the licensor may have the right to terminate the license, in which event we would not be able to develop or market products covered by the license.

Additionally, the milestone and other payments associated with these licenses will make it less profitable for us to develop our drug candidates. See “Business - Patents and Other Proprietary Rights” for a description of our license agreements.

Licensing of intellectual property is of critical importance to our business and involves complex legal, business, and scientific issues. Disputes may arise regarding intellectual property subject to a licensing agreement, including but not limited to:

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

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

Additionally, the research resulting in certain of our licensed patent rights and technology was funded by the U.S. government. As a result, the government may have certain rights, or march-in rights, to such patent rights and technology. When new technologies are developed with government funding, the government generally obtains certain rights in any resulting patents, including a non-exclusive license authorizing the government to use the invention for non-commercial purposes. The government can exercise its march-in rights if it determines that action is necessary because we fail to achieve practical application of the 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, our rights in such inventions may be subject to certain requirements to manufacture products embodying such inventions in the U.S. Any exercise by the government of such rights could harm our competitive position, business, financial condition, results of operations and prospects.

Furthermore, we currently have very limited product development capabilities and no manufacturing, marketing or sales capabilities. For us to research, develop and test our product candidates, we need to contract or partner with outside researchers, in most cases with or through those parties that did the original research and from whom we have licensed the technologies. If products are successfully developed and approved for commercialization, then we will need to enter into additional collaboration and other agreements with third parties to manufacture and market our products. We may not be able to induce the third parties to enter into these agreements, and, even if we are able to do so, the terms of these agreements may not be favorable to us. Our inability to enter into these agreements could delay or preclude the development, manufacture and/or marketing of some of our product candidates or could significantly increase the costs of doing so. In the future, we may grant to our development partners rights to license and commercialize pharmaceutical and related products developed under the agreements with them, and these rights may limit our flexibility in considering alternatives for the commercialization of these products. Furthermore, third-party manufacturers or suppliers may not be able to meet our needs with respect to timing, quantity and quality for the products.

Additionally, if we do not enter into relationships with additional third parties for the marketing of our products, if and when they are approved and ready for commercialization, we would have to build our own sales force or enter into commercialization agreements with other companies. Development of an effective sales force in any part of the world would require significant financial resources, time and expertise. We may not be able to obtain the financing necessary to establish a sales force in a timely or cost effective manner, if at all, and any sales force we are able to establish may not be capable of generating demand for our product candidates, if they are approved.

We may suffer product and other liability claims; we maintain only limited product liability insurance, which may not be sufficient.

The clinical testing, manufacture and sale of our products involves an inherent risk that human subjects in clinical testing or consumers of our products may suffer serious bodily injury or death due to side effects, allergic reactions or other unintended negative reactions to our products. As a result, product and other liability claims may be brought against us. We currently have clinical trial and product liability insurance with limits of liability of \$10 million, which may not be sufficient to cover our potential liabilities. Because liability insurance is expensive and difficult to obtain, we may not be able to maintain existing insurance or obtain additional liability insurance on acceptable terms or with adequate coverage against potential liabilities. Furthermore, if any claims are brought against us, even if we are fully covered by insurance, we may suffer harm such as adverse publicity.

We may use hazardous chemicals in our business. Potential claims relating to improper handling, storage or disposal of these chemicals could affect us and be time consuming and costly.

Our research and development processes and/or those of our third party contractors involve the controlled use of hazardous materials and chemicals. These hazardous chemicals are reagents and solvents typically found in a chemistry laboratory. Our operations also may produce hazardous waste products. Federal, state and local laws and regulations govern the use, manufacture, storage, handling and disposal of hazardous materials. While we attempt to comply with all environmental laws and regulations, including those relating to the outsourcing of the disposal of all hazardous chemicals and waste products, we cannot eliminate the risk of contamination from or discharge of hazardous materials and any resultant injury. In the event of such an accident, we could be held liable for any resulting damages and any liability could materially adversely affect our business, financial condition and results of operations.

Compliance with environmental laws and regulations may be expensive. Current or future environmental regulations may impair our research, development or production efforts. We might have to pay civil damages in the event of an improper or unauthorized release of, or exposure of individuals to, hazardous materials. We are not insured against these environmental risks. We may agree to indemnify our collaborators in some circumstances against damages and other liabilities arising out of development activities or products produced in connection with these collaborations.

In addition, the federal, state and local laws and regulations governing the use, manufacture, storage, handling and disposal of hazardous or radioactive materials and waste products may require us to incur substantial compliance costs that could materially adversely affect our business, financial condition and results of operations.

We may not be able to compete with our larger and better financed competitors in the biotechnology industry.

The biotechnology industry is intensely competitive, subject to rapid change and sensitive to new product introductions or enhancements. Most of our existing competitors have greater financial resources, larger technical staffs, and larger research budgets than we have, as well as greater experience in developing products and conducting clinical trials. Our competition is particularly intense in the gastroenterology and transplant areas and is also intense in the therapeutic area of inflammatory bowel diseases. We face intense competition in the biodefense area from various public and private companies and universities as well as governmental agencies, such as the U.S. Army, which may have their own proprietary technologies that may directly compete with our technologies. In addition, there may be other companies that are currently developing competitive technologies and products or that may in the future develop technologies and products that are comparable or superior to our technologies and products. We may not be able to compete with our existing and future competitors, which could lead to the failure of our business.

Additionally, if a competitor receives FDA approval before we do for a drug that is similar to one of our product candidates, FDA approval for our product candidate may be precluded or delayed due to periods of non-patent exclusivity and/or the listing with the FDA by the competitor of patents covering its newly-approved drug product. Periods of non-patent exclusivity for new versions of existing drugs such as our current product candidates can extend up to three and one-half years. See “Business - The Drug Approval Process.”

These competitive factors could require us to conduct substantial new research and development activities to establish new product targets, which would be costly and time consuming. These activities would adversely affect our ability to commercialize products and achieve revenue and profits.

Competition and technological change may make our product candidates and technologies less attractive or obsolete.

We compete with established pharmaceutical and biotechnology companies that are pursuing other forms of treatment for the same indications we are pursuing and that have greater financial and other resources. Other companies may succeed in developing products earlier than us, obtaining FDA approval for products more rapidly, or developing products that are more effective than our product candidates. Research and development by others may render our technology or product candidates obsolete or noncompetitive, or result in treatments or cures superior to any therapy we develop. We face competition from companies that internally develop competing technology or acquire competing technology from universities and other research institutions. As these companies develop their technologies, they may develop competitive positions that may prevent, make futile, or limit our product commercialization efforts, which would result in a decrease in the revenue we would be able to derive from the sale of any products.

There can be no assurance that any of our product candidates will be accepted by the marketplace as readily as these or other competing treatments. Furthermore, if our competitors’ products are approved before ours, it could be more difficult for us to obtain approval from the FDA. Even if our products are successfully developed and approved for use by all governing regulatory bodies, there can be no assurance that physicians and patients will accept our product(s) as a treatment of choice.

Furthermore, the pharmaceutical research industry is diverse, complex, and rapidly changing. By its nature, the business risks associated therewith are numerous and significant. The effects of competition, intellectual property disputes, market acceptance, and FDA regulations preclude us from forecasting revenues or income with certainty or even confidence.

Our business could be harmed if we fail to retain our current personnel or if they are unable to effectively run our business.

We currently have 18 employees and we depend upon these employees, in particular Dr. Christopher Schaber, our President and Chief Executive Officer, to manage the day-to-day activities of our business. Because we have such limited personnel, the loss of any of them or our inability to attract and retain other qualified employees in a timely manner would likely have a negative impact on our operations. We may be unable to effectively manage and operate our business, and our business may suffer, if we lose the services of our employees.

Instability and volatility in the financial markets could have a negative impact on our business, financial condition, results of operations, and cash flows.

During recent years, there has been substantial volatility in financial markets due at least in part to the uncertainty with regard to the global economic environment. In addition, there has been substantial uncertainty in the capital markets and access to additional financing is uncertain. Moreover, customer spending habits may be adversely affected by current and future economic conditions. These conditions could have an adverse effect on our industry and business, including our financial condition, results of operations, and cash flows.

To the extent that we do not generate sufficient cash from operations, we may need to issue stock or incur indebtedness to finance our plans for growth. Recent turmoil in the credit markets and the potential impact on the liquidity of major financial institutions may have an adverse effect on our ability to fund our business strategy through borrowings, under either existing or newly created instruments in the public or private markets on terms we believe to be reasonable, if at all.

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

The State of New Jersey's Technology Business Tax Certificate Program allows certain high technology and biotechnology companies to sell unused net operating loss ("NOL") carryforwards to other New Jersey-based corporate taxpayers. In accordance with this program, for the year ended December 31, 2017, we sold New Jersey NOL carryforwards, resulting in the recognition of \$610,676 of income tax benefit. Due to a delay in the program, these funds were not recognized or received until April of 2019. We have applied for and received confirmation that we have NOLs that qualify for an income tax benefit in the amount of \$836,893 for the year ended December 31, 2018. The program has been delayed again this year, and we will therefore not recognize this benefit until we receive our certificate for the funds. We have not yet sold our 2019 New Jersey NOLs but may do so in the future. If there is an unfavorable change in the State of New Jersey's Technology Business Tax Certificate Program (whether as a result of a change in law, policy or otherwise) that terminates the program or eliminates or reduces our ability to use or sell our NOL carryforwards or if we are unable to find a suitable buyer to utilize our New Jersey NOL carryforwards to the extent the NOLs expire before we are able to utilize them against our taxable income, our cash taxes may increase which may have an adverse effect on our financial condition.

Global pathogens that could have an impact on financial markets, materials sourcing, patients, governments and population (e.g. COVID-19).

Based on the current outbreak of the Coronavirus SARS-CoV-2, the pathogen responsible for COVID-19, which has already had an impact on financial markets, there could be additional repercussions to our operating business, including but not limited to, the sourcing of materials for our product candidates, manufacture of supplies for our preclinical and/or clinical studies, delays in clinical operations, which may include the availability or the continued availability of patients for our trials due to such things as quarantines, our conduct of patient monitoring and clinical trial data retrieval at investigational study sites.

The future impact of the outbreak is highly uncertain and cannot be predicted, and we cannot provide any assurance that the outbreak will not have a material adverse impact on our operations or future results or filings with regulatory health authorities. The extent of the impact to us, if any, will depend on future developments, including actions taken to contain the coronavirus.

Risks Related to our Intellectual Property

We may be unable to commercialize our products if we are unable to protect our proprietary rights, and we may be liable for significant costs and damages if we face a claim of intellectual property infringement by a third party.

Our near and long-term prospects depend in part on our ability to obtain and maintain patents, protect trade secrets and operate without infringing upon the proprietary rights of others. In the absence of patent and trade secret protection, competitors may adversely affect our business by independently developing and marketing substantially equivalent or superior products and technology, possibly at lower prices. We could also incur substantial costs in litigation and suffer diversion of attention of technical and management personnel if we are required to defend ourselves in intellectual property infringement suits brought by third parties, with or without merit, or if we are required to initiate litigation against others to protect or assert our intellectual property rights. Moreover, any such litigation may not be resolved in our favor.

Although we and our licensors have filed various patent applications covering the uses of our product candidates, patents may not be issued from the patent applications already filed or from applications that we might file in the future. Moreover, the patent position of companies in the pharmaceutical industry generally involves complex legal and factual questions, and has been the subject of much litigation. Any patents we own or license, now or in the future, may be challenged, invalidated or circumvented. To date, no consistent policy has been developed in the U.S. Patent and Trademark Office (the "PTO") regarding the breadth of claims allowed in biotechnology patents.

In addition, because patent applications in the U.S. are maintained in secrecy until patent applications publish or patents issue, and because publication of discoveries in the scientific or patent literature often lags behind actual discoveries, we cannot be certain that we and our licensors are the first creators of inventions covered by any licensed patent applications or patents or that we or they are the first to file. The PTO may commence interference proceedings involving patents or patent applications, in which the question of first inventorship is contested. Accordingly, the patents owned or licensed to us may not be valid or may not afford us protection against competitors with similar technology, and the patent applications licensed to us may not result in the issuance of patents.

It is also possible that our owned and licensed technologies may infringe on patents or other rights owned by others, and licenses to which may not be available to us. We may be unable to obtain a license under such patent on terms favorable to us, if at all. We may have to alter our products or processes, pay licensing fees or cease activities altogether because of patent rights of third parties.

In addition to the products for which we have patents or have filed patent applications, we rely upon unpatented proprietary technology and may not be able to meaningfully protect our rights with regard to that unpatented proprietary technology. Furthermore, to the extent that consultants, key employees or other third parties apply technological information developed by them or by others to any of our proposed projects, disputes may arise as to the proprietary rights to this information, which may not be resolved in our favor.

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

The pharmaceutical industry has been characterized by extensive litigation regarding patents and other intellectual property rights, and companies have employed intellectual property litigation to gain a competitive advantage. We may become subject to infringement claims or litigation arising out of patents and pending applications of our competitors, or additional interference proceedings declared by the PTO to determine the priority of inventions. The defense and prosecution of intellectual property suits, PTO proceedings, and related legal and administrative proceedings are costly and time-consuming to pursue, and their outcome is uncertain. Litigation may be necessary to enforce our issued patents, to protect our trade secrets and know-how, or to determine the enforceability, scope, and validity of the proprietary rights of others. An adverse determination in litigation or interference proceedings to which we may become a party could subject us to significant liabilities, require us to obtain licenses from third parties, or restrict or prevent us from selling our products in certain markets. Although patent and intellectual property disputes might be settled through licensing or similar arrangements, the costs associated with such arrangements may be substantial and could include our paying large fixed payments and ongoing royalties. Furthermore, the necessary licenses may not be available on satisfactory terms or at all.

Competitors may infringe our patents, and we may file infringement claims to counter infringement or unauthorized use. This can be expensive, particularly for a company of our size, and time-consuming. In addition, in an infringement proceeding, a court may decide that a patent of ours is not valid or is unenforceable or may refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover its technology. An adverse determination of any litigation or defense proceedings could put one or more of our patents at risk of being invalidated or interpreted narrowly.

Also, a third party may assert that our patents are invalid and/or unenforceable. There are no unresolved communications, allegations, complaints or threats of litigation related to the possibility that our patents are invalid or unenforceable. Any litigation or claims against us, whether or not merited, may result in substantial costs, place a significant strain on our financial resources, divert the attention of management and harm our reputation. An adverse decision in litigation could result in inadequate protection for our product candidates and/or reduce the value of any license agreements we have with third parties.

Interference proceedings brought before the PTO may be necessary to determine priority of invention with respect to our patents or patent applications. During an interference proceeding, it may be determined that we do not have priority of invention for one or more aspects in our patents or patent applications and could result in the invalidation in part or whole of a patent or could put a patent application at risk of not issuing. Even if successful, an interference proceeding may result in substantial costs and distraction to our management.

Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation or interference proceedings, there is a risk that some of our confidential information could be compromised by disclosure. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments. If investors perceive these results to be negative, the price of our common stock could be adversely affected.

If we infringe the rights of third parties we could be prevented from selling products, forced to pay damages, and defend against litigation.

If our products, methods, processes and other technologies infringe the proprietary rights of other parties, we could incur substantial costs and we may have to: obtain licenses, which may not be available on commercially reasonable terms, if at all; abandon an infringing product candidate; redesign our products or processes to avoid infringement; stop using the subject matter claimed in the patents held by others; pay damages; and/or defend litigation or administrative proceedings which may be costly whether we win or lose, and which could result in a substantial diversion of our financial and management resources.

Risks Related to our Securities

The price of our common stock and warrants may be highly volatile.

The market price of our securities, like that of many other research and development public pharmaceutical and biotechnology companies, has been highly volatile and the price of our common stock and warrants may be volatile in the future due to a wide variety of factors, including:

- announcements by us or others of results of pre-clinical testing and clinical trials;
- announcements of technological innovations, more important bio-threats or new commercial therapeutic products by us, our collaborative partners or our present or potential competitors;
- failure of our common stock or warrants to continue to be listed or quoted on a national exchange or market system, such as The Nasdaq Stock Market (“NASDAQ”) or NYSE Amex LLC;
- our quarterly operating results and performance;
- developments or disputes concerning patents or other proprietary rights;
- acquisitions;
- litigation and government proceedings;
- adverse legislation;
- changes in government regulations;
- our available working capital;
- economic and other external factors;
- general market conditions.

Since January 1, 2020, the closing stock price of our common stock has fluctuated between a high of \$3.34 per share to a low of \$1.42 per share. Since January 1, 2020, the closing price of our common stock warrants has fluctuated between a high of \$1.08 per warrant to a low of \$0.16 per warrant. On March 23, 2020 the last reported sales prices of our common stock and our common stock warrant on The Nasdaq Capital Market were \$1.47 per share and \$0.48 per warrant. The fluctuation in the price of our common stock and warrants has sometimes been unrelated or disproportionate to our operating performance. In addition, potential dilutive effects of future sales of shares of common stock and warrants by us, as well as potential sale of common stock by the holders of warrants and options, could have an adverse effect on the market price of our shares.

If we fail to remain current with our listing requirements, we could be removed from The Nasdaq Capital Market, which would limit the ability of broker-dealers to sell our securities and the ability of shareholders to sell their securities in the secondary market.

Companies trading on The Nasdaq Stock Market, such as our Company, must be reporting issuers under Section 12 of the Exchange Act, as amended, and must meet the listing requirements in order to maintain the listing of common stock on The Nasdaq Capital Market. If we do not meet these requirements, the market liquidity for our securities could be severely adversely affected by limiting the ability of broker-dealers to sell our securities and the ability of shareholders to sell their securities in the secondary market.

The warrants may not have any value.

The outstanding warrants do not confer any rights of common stock ownership on their holders, such as voting rights or the right to receive dividends, but rather merely represent the right to acquire shares of common stock at a fixed price for a limited period of time. Specifically, the holders of the outstanding warrants may exercise their right to acquire the common stock and pay the per share exercise price, prior to the expiration date, after which date any unexercised warrants will expire and have no further value. In the event our common stock does not exceed the exercise price of the warrants during the period when the warrants are exercisable, the warrants may not have any value.

Shareholders may suffer substantial dilution related to issued stock warrants and options.

As of December 31, 2019, we had a number of agreements or obligations that may result in dilution to investors. These include:

- warrants to purchase a total of approximately 6,192,711 shares of our common stock at a current weighted average exercise price of approximately \$2.88;
- options to purchase approximately 1,506,972 shares of our common stock at a current weighted average exercise price of approximately \$3.77; and
- The FBR Sales Agreement pursuant to which we may, but have no obligation to, sell up to an additional \$0.9 million worth of our common stock as of March 23, 2020.

We also have an incentive compensation plan for our management, employees and consultants. We have granted, and expect to grant in the future, options to purchase shares of our common stock to our directors, employees and consultants. To the extent that warrants or options are exercised, our stockholders will experience dilution and our stock price may decrease.

Our shares of common stock and warrants are thinly traded, so stockholders may be unable to sell at or near ask prices or at all if they need to sell shares or warrants to raise money or otherwise desire to liquidate their shares.

Our common stock and warrants have from time to time been “thinly-traded,” meaning that the number of persons interested in purchasing our common stock or warrants at or near ask prices at any given time may be relatively small or non-existent. This situation is attributable to a number of factors, including the fact that we are a small company that is relatively unknown to stock analysts, stock brokers, institutional investors and others in the investment community that generate or influence sales volume, and that even if we came to the attention of such persons, they tend to be risk-averse and would be reluctant to follow an unproven company such as ours or purchase or recommend the purchase of our shares until such time as we become more seasoned and viable. As a consequence, there may be periods of several days or more when trading activity in our shares is minimal or non-existent, as compared to a seasoned issuer which has a large and steady volume of trading activity that will generally support continuous sales without an adverse effect on share price. We cannot give stockholders any assurance that a broader or more active public trading market for our common shares and warrants will develop or be sustained, or that current trading levels will be sustained.

We do not currently intend to pay dividends on our common stock in the foreseeable future, and consequently, our stockholders’ ability to achieve a return on their investment will depend on appreciation in the price of our common stock.

We have never declared or paid cash dividends on our common stock and do not anticipate paying any cash dividends to holders of our common stock in the foreseeable future. Consequently, our stockholders must rely on sales of their common stock and warrants after price appreciation, which may never occur, as the only way to realize any future gains on their investments. There is no guarantee that shares of our common stock or warrants will appreciate in value or even maintain the price at which our stockholders have purchased their shares.

Upon our dissolution, our stockholders may not recoup all or any portion of their investment.

In the event of our liquidation, dissolution or winding-up, whether voluntary or involuntary, the proceeds and/or our assets remaining after giving effect to such transaction, and the payment of all of our debts and liabilities will be distributed to the holders of common stock on a pro rata basis. There can be no assurance that we will have available assets to pay to the holders of common stock, or any amounts, upon such a liquidation, dissolution or winding-up. In this event, our stockholders could lose some or all of their investment.

The issuance of our common stock pursuant to the terms of the asset purchase agreement with Hy Biopharma Inc. may cause dilution and the issuance of such shares of common stock, or the perception that such issuances may occur, could cause the price of our common stock to fall.

On April 1, 2014, we entered into an option agreement pursuant to which Hy Biopharma granted us an option to purchase certain assets, properties and rights (the “Hypericin Assets”) related to the development of Hy Biopharma’s synthetic hypericin product candidate for the treatment of CTCL, which we refer to as SGX301, from Hy Biopharma. In exchange for the option, we paid \$50,000 in cash and issued 4,307 shares of common stock in the aggregate to Hy Biopharma and its assignees. We subsequently exercised the option, and on September 3, 2014, we entered into an asset purchase agreement with Hy Biopharma, pursuant to which we purchased the Hypericin Assets. Pursuant to the purchase agreement, we initially paid \$275,000 in cash and issued 184,912 shares of common stock in the aggregate to Hy Biopharma and its assignees, and the licensors of the license agreement acquired from Hy Biopharma. In March 2020, we issued 1,956,182 shares of common stock at a value of \$5,000,000 (based upon an effective per share price of \$2.56) as a result of SGX301 demonstrating statistical significant treatment response in the Phase 3 clinical trial. We may issue up to \$5.0 million worth of our common stock (subject to a cap equal to 19.99% of our issued and outstanding common stock) in the aggregate upon attainment of a specified milestone. The final milestone payment will be payable if SGX301 is approved for the treatment of CTCL by either the FDA or the EMA. Also on September 3, 2014, we entered into a Registration Rights Agreement with Hy Biopharma, pursuant to which we may be required to file a registration statement with the SEC.

The number of shares that we may issue under the purchase agreement will fluctuate based on the market price of our common stock. Depending on market liquidity at the time, the issuance of such shares may cause the trading price of our common stock to fall.

We may ultimately issue all, some or none of the additional shares of our common stock that may be issued pursuant to the purchase agreement. We are required to register any shares issued pursuant to the purchase agreement for resale under the Securities Act of 1933, as amended (the “Securities Act”). After any such shares are registered, the holders will be able to sell all, some or none of those shares. Therefore, issuances by us under the purchase agreement could result in substantial dilution to the interests of other holders of our common stock. Additionally, the issuance of a substantial number of shares of our common stock pursuant to the purchase agreement, or the anticipation of such issuances, could make it more difficult for us to sell equity or equity-related securities in the future at a time and at a price that we might otherwise wish to effect sales.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

We currently lease approximately 6,200 square feet of office space at 29 Emmons Drive, Suite B-10 in Princeton, New Jersey pursuant to a lease that was amended in October 2017 and expires in October 2020. This office space currently serves as our corporate headquarters, and both of our business segments (Specialized BioTherapeutics and Public Health Solutions), operate from this space. The rent for the first 12 months was approximately \$11,367 per month, or approximately \$22.00 per square foot. The rent increased to approximately \$11,625 per month, or approximately \$22.50 per square foot, for the 12 months beginning November 1, 2018 and then increased to approximately \$11,883 per month, or approximately \$23.00 per square foot, beginning November 1, 2019, which rate will continue for the remainder of the lease. Our office space is sufficient to satisfy our current needs.

Item 3. Legal Proceedings

From time to time, we are a party to claims and legal proceedings arising in the ordinary course of business. Our management evaluates our exposure to these claims and proceedings individually and in the aggregate and allocates additional monies for potential losses on such litigation if it is possible to estimate the amount of loss and if the amount of the loss is probable.

PART II

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

Our common stock is traded on The Nasdaq Capital Market under the symbol “SNGX.” The following table sets forth the high and low sales prices per share of our common stock for the periods indicated, as reported by The Nasdaq Capital Market.

Period	Price Range	
	High	Low
Year Ended December 31, 2018:		
First Quarter	\$ 3.70	\$ 1.86
Second Quarter	\$ 1.96	\$ 0.91
Third Quarter	\$ 1.97	\$ 0.95
Fourth Quarter	\$ 2.20	\$ 0.80
Year Ended December 31, 2019:		
First Quarter	\$ 1.32	\$ 0.85
Second Quarter	\$ 0.96	\$ 0.65
Third Quarter	\$ 1.39	\$ 0.71
Fourth Quarter	\$ 1.49	\$ 0.85

On March 23, 2020, the last reported price of our common stock quoted on The Nasdaq Capital Market was \$1.47 per share. The Nasdaq Capital Market prices set forth above represent inter-dealer quotations, without adjustment for retail mark-up, mark-down or commission, and may not represent the prices of actual transactions. Our stock is listed on The Nasdaq Capital Market under the under the symbol “SNGX.” On December 13, 2016, certain of our common stock warrants began trading on The Nasdaq Capital Market under the symbol “SNGXW”. For the period from January 1, 2018 through December 31, 2019, the high and low sales price per warrant as reported by Nasdaq were \$0.33 and \$0.05 respectively. On March 23, 2020, the last reported price of our common stock warrants on Nasdaq was \$0.48 per warrant.

Transfer Agent

The transfer agent and registrar for our common stock and warrants is American Stock Transfer & Trust Company, LLC. The address is 6201 15th Avenue, Brooklyn, NY 11219 and the telephone number is (718) 921-8200.

Holders of Common Stock

As of March 23, 2020, there were 97 holders of record of our common stock. As of such date, 25,775,631 shares of our common stock were issued and outstanding.

Dividends

We have never declared nor paid any cash dividends, and currently intend to retain all our cash and any earnings for use in our business and, therefore, do not anticipate paying any cash dividends in the foreseeable future. Any future determination to pay cash dividends will be at the discretion of the Board of Directors and will be dependent upon our consolidated financial condition, results of operations, capital requirements and such other factors as the Board of Directors deems relevant.

Item 6. Selected Financial Data

Not applicable.

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

Our Business Overview

We are a late-stage biopharmaceutical company focused on developing and commercializing products to treat rare diseases where there is an unmet medical need. We maintain two active business segments: Specialized BioTherapeutics (formerly "BioTherapeutics") and Public Health Solutions (formerly "Vaccines/BioDefense").

Our Specialized BioTherapeutics business segment is developing a novel photodynamic therapy (SGX301) utilizing topical synthetic hypericin activated with safe visible fluorescent light for the treatment of CTCL, our first-in-class innate defense regulator technology, dusquetide (SGX942) for the treatment of oral mucositis in head and neck cancer, and proprietary formulations of oral beclomethasone 17,21-dipropionate ("BDP") for the prevention/treatment of gastrointestinal ("GI") disorders characterized by severe inflammation, including pediatric Crohn's disease (SGX203) and acute radiation enteritis (SGX201).

Our Public Health Solutions business segment includes active development programs for RiVax[®], our ricin toxin vaccine candidate and SGX943, our therapeutic candidate for antibiotic resistant and emerging infectious disease. The development of our vaccine programs currently is supported by our heat stabilization technology, known as ThermoVax[®], under existing and on-going government contract funding. With the government contract from the National Institute of Allergy and Infectious Diseases ("NIAID"), we will attempt to advance the development of RiVax[®] to protect against exposure to ricin toxin.

An outline of our business strategy follows:

- Following positive primary endpoint topline analysis for the Phase 3 clinical trial of SGX301, continue to explore partnership and commercialization while pursuing NDA filing;
- Following positive interim analysis, complete enrollment and report final results in our pivotal Phase 3 clinical trial of SGX942 for the treatment of oral mucositis in head and neck cancer;
- Continue development of RiVax[®] in combination with our ThermoVax[®] technology to develop a new heat stable vaccine in biodefense with NIAID funding support;
- Continue to apply for and secure additional government funding for each of our Specialized BioTherapeutics and Public Health Solutions programs through grants, contracts and/or procurements;
- Pursue business development opportunities for our pipeline programs, as well as explore merger/acquisition strategies; and
- Acquire or in-license new clinical-stage compounds for development.

Corporate Information

We were incorporated in Delaware in 1987 under the name Biological Therapeutics, Inc. In 1987, we merged with Biological Therapeutics, Inc., a North Dakota corporation, pursuant to which we changed our name to “Immunotherapeutics, Inc.” We changed our name to “Endorex Corp.” in 1996, to “Endorex Corporation” in 1998, to “DOR BioPharma, Inc.” in 2001, and finally to “Soligenix, Inc.” in 2009. Our principal executive offices are located at 29 Emmons Drive, Suite B-10, Princeton, New Jersey 08540 and our telephone number is (609) 538-8200.

Our Product Candidates in Development

The following tables summarize our product candidates under development:

Specialized BioTherapeutics Product Candidates*

<u>Soligenix Product Candidate</u>	<u>Therapeutic Indication</u>	<u>Stage of Development</u>
SGX301	Cutaneous T-Cell Lymphoma	Phase 2 trial completed; demonstrated significantly higher response rate compared to placebo; Phase 3 demonstrated statistical significance in primary endpoint in March 2020; extended treatment and follow-up outcomes pending throughout 2020
SGX942	Oral Mucositis in Head and Neck Cancer	Phase 2 trial completed; demonstrated significant response compared to placebo with positive long-term (12 month) safety also reported; Phase 3 clinical trial enrolled first patient in December 2017, with positive interim analysis received in August 2019; final results expected in the fourth quarter of 2020
SGX203†	Pediatric Crohn’s disease	Phase 1/2 clinical trial completed; efficacy data, pharmacokinetic (PK)/pharmacodynamic (PD) profile and safety profile demonstrated; Phase 3 clinical trial initiation contingent upon additional funding, such as through partnership
SGX201†	Acute Radiation Enteritis	Phase 1/2 clinical trial completed; safety profile and preliminary efficacy demonstrated; further clinical development contingent upon additional funding, such as through partnership

Public Health Solutions†*

Soligenix Product Candidate	Indication	Stage of Development
ThermoVax®	Thermostability of vaccines for Ricin toxin, Ebola, Marburg and SARS-CoV-2 (COVID-19) viruses	Pre-clinical
RiVax®	Vaccine against Ricin Toxin Poisoning	Phase 1a and 1b trials completed, safety and neutralizing antibodies for protection demonstrated; Phase 1c trial initiated December 2019, closed January 2020
SGX943	Therapeutic against Emerging Infectious Diseases	Pre-clinical

* *Timelines subject to potential disruption due to COVID-19 outbreak.*

† *Contingent upon continued government contract/grant funding or other funding source.*

Critical Accounting Policies

Our discussion and analysis of our financial condition and results of operations are based upon our consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the U.S. The preparation of these financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities and expenses, and related disclosure of contingent assets and liabilities. We evaluate these estimates and judgments on an on-going basis.

Revenue Recognition

Our revenues are primarily generated from government contracts and grants. The revenue from government contracts and grants is based upon subcontractor costs and internal costs incurred that are specifically covered by the contracts and grants, plus a facilities and administrative rate that provides funding for overhead expenses and management fees. These revenues are recognized when expenses have been incurred by subcontractors or when we incur reimbursable internal expenses that are related to the government contracts and grants.

Research and Development Costs

Research and development costs are charged to expense when incurred in accordance with FASB ASC 730, *Research and Development*. Research and development includes costs such as clinical trial expenses, contracted research and license agreement fees with no alternative future use, supplies and materials, salaries, share-based compensation, employee benefits, equipment depreciation and allocation of various corporate costs. Purchased in-process research and development expense represents the value assigned or paid for acquired research and development for which there is no alternative future use as of the date of acquisition.

Accounting for Leases

On January 1, 2019, the Company adopted ASC No. 2016-02, “Leases” (Topic 842) (the “Lease Standard”), a new FASB standard which requires all leases with terms longer than 12 months be recognized by the lessee on its balance sheet as a right-of-use lease asset and a corresponding lease liability, including leases currently accounted for as operating leases, and key information about leasing arrangements to be disclosed.

The Company adopted the Lease Standard under the alternative transition method permitted by ASU 2018-11. This transition method allowed the Company to initially apply the requirements of the Lease Standard at the adoption date, versus at the beginning of the earliest period presented. The Company elected the transition package of practical expedients, which permits not separating lease and non-lease components for all of its leases and the short-term lease recognition exemption for all of its leases that qualify; it did not elect the use of hindsight practical expedient.

Use of Estimates and Assumptions

The preparation of financial statements in conformity with accounting principles generally accepted in the U.S. requires management to make estimates and assumptions such as the fair value of warrants and stock options and recovery of the useful life of intangibles that affect the reported amounts in the financial statements and accompanying notes. Actual results could differ from those estimates.

Material Changes in Results of Operations

Year Ended December 31, 2019 Compared to 2018

For the year ended December 31, 2019, we had a net loss of \$9,355,592 as compared to a net loss of \$8,899,975 for the prior year, representing an increased loss of \$455,617 or 5%. The increase in net loss is primarily due to increased expenditures incurred to support both the pivotal Phase 3 trial of SGX301 in the treatment of CTCL and the pivotal Phase 3 trial of SGX942 in the treatment of oral mucositis in head and neck cancer. For the years ended December 31, 2019 and 2018, revenues and associated costs related to government contracts and grants awarded in support of our development of OrbeShield[®] (oral BDP) for the treatment of GI ARS and RiVax[®] and other development programs. For the year ended December 31, 2019, we had revenues of \$4,629,916 as compared to \$5,241,448 for the prior year, representing a decrease of \$611,532 or 12%. The decrease in revenues was primarily a result of the completion of the two Phase 3 trials of SGX301 and SGX942.

We incurred costs related to contract and grant revenues in the year ended December 31, 2019 and 2018 of \$3,567,415 and \$4,597,715, respectively, representing a decrease of \$1,030,300 or 22%. The decrease in costs was primarily the result of a decrease in specific salaries and headcount no longer qualified for reimbursement under the grants and contracts, in addition to grants ending in 2019.

Our gross profit for the year ended December 31, 2019 was \$1,062,501 or 23%, as compared to \$643,733 or 12% for the prior year, representing an increase of \$418,768 or 65%. The increase in gross profit and gross profit margin for the year ended December 31, 2019 is attributable to the achievement of milestones under our RiVax[®] contract with NIAID.

Research and development expenses increased by \$1,371,656 or 20%, to \$8,122,610 for the year ended December 31, 2019 as compared to \$6,750,954 for the prior year. The increase in research and development spending for the year ended December 31, 2019 was related to expenditures incurred in the expansion of the Phase 3 clinical trial of SGX942 as well as the ongoing Phase 3 clinical trial of SGX301.

General and administrative expenses increased \$529,152 or 18%, to \$3,480,912 for the year ended December 31, 2019, as compared to \$2,951,760 for the prior year. This increase is primarily related to employee compensation increases plus newly added employee positions, in addition to expenses related to the UK research and development tax credit.

Other income for the year ended December 31, 2019 was \$574,753 as compared to \$159,006 for the prior year, reflecting an increase of \$415,747 or 261%. The increase was primarily due to the 2018 UK research and development tax credit.

The State of New Jersey's Technology Business Tax Certificate Program allows certain high technology and biotechnology companies to sell unused net operating loss ("NOL") carryforwards to other New Jersey-based corporate taxpayers. In accordance with this program, for the year ended December 31, 2017, we sold New Jersey NOL carryforwards, resulting in the recognition of \$610,676 of income tax benefit. Due to a delay in the program, these funds were not recognized or received until April 2019. We have applied for and received confirmation that we have NOLs that qualify for an income tax benefit in the amount of \$836,893 for the year ended December 31, 2018. The program has been delayed again this year, and we will therefore not recognize this benefit until we receive our certificate for the funds. We have not yet sold our 2019 New Jersey NOLs but may do so in the future. We will continue to explore opportunities to sell unused NOL carryforwards for the year ended December 31, 2019. However, there can be no assurance as to the continuation or magnitude of this program in future years.

Business Segments

We maintain two active business segments for the years ended December 31, 2019 and 2018: Public Health Solutions and Specialized BioTherapeutics.

Revenues for the Public Health Solutions business segment for the year ended December 31, 2019 were \$3,402,014 as compared to \$4,156,641 for the year ended December 31, 2018, representing a decrease of \$754,627 or 18%. The decrease in revenues was primarily the result of decreased salary and headcount that no longer qualifies for reimbursement under the grants and contracts, in addition to grants and contracts ending.

Revenues for the Specialized BioTherapeutics business segment for the year ended December 31, 2019 were \$1,227,902 as compared to \$1,084,807 for the year ended December 31, 2018, representing an increase of \$143,095 or 13%. The increase was due to reimbursable development activity under the oral mucositis juvenile toxicology grant to support to support the evaluation of SGX942 (dusquetide) in pediatric indications.

Income from operations for the Public Health Solutions business segment for the year ended December 31, 2019 was \$153,969 as compared to a loss of \$237,640 for the year ended December 31, 2018, representing a decreased loss of \$391,609 or 165%. The income for the year ended December 31, 2019 is attributable to a decrease in labor spent on the RiVax[®] clinical trial. Loss from operations for the Specialized BioTherapeutics business segment for the year ended December 31, 2019 was \$6,738,285 as compared to \$5,439,294 for the year ended December 31, 2018, representing an increased loss of \$1,298,991 or 24%. This is primarily attributed to the additional expense incurred in patient enrollments in the Phase 3 clinical trial of SGX942 for the treatment of oral mucositis in head and neck cancer.

Amortization and depreciation expense for the Public Health Solutions business segment for the year ended December 31, 2019 was \$17,507 as compared to \$17,951 for the year ended December 31, 2018. Amortization and depreciation expense for the Specialized BioTherapeutics business segment for the year ended December 31, 2019 was \$18,122 as compared to \$21,018 for the year ended December 31, 2018. The decrease in amortization and depreciation expense was the result of office furniture and equipment and patents becoming fully amortized during the year ended December 31, 2019.

Financial Condition and Liquidity

Cash and Working Capital

As of December 31, 2019, we had cash and cash equivalents of \$5,420,708 as compared to \$8,983,717 as of December 31, 2018, representing a decrease of \$3,563,009 or 40%. As of December 31, 2019, we had working capital of \$1,181,249, representing a decrease of \$4,949,929 as compared to working capital of \$6,131,178 for the prior year. The decrease in cash and cash equivalents was primarily related to cash used in operations, partially offset by proceeds from our financing activities. The decrease in working capital was a result of the increased expenditures incurred in the expansion of the pivotal Phase 3 clinical trial of SGX942 for the treatment of oral mucositis in head and neck cancer, as well as the ongoing Phase 3 clinical trial of SGX301 for the treatment of CTCL.

Based on our current rate of cash outflows, cash on hand, proceeds from government contract and grant programs and proceeds available from the FBR Sales Agreement, management believes that its current cash will be sufficient to meet the anticipated cash needs for working capital and capital expenditures for at least the next twelve months from issuance of the financial statements.

Our plans with respect to our liquidity management include, but are not limited to, the following:

- We have up to \$2.97 million in active government contract funding still available as of December 31, 2019 to support our associated research programs through 2020 and beyond, provided the federal agencies exercise all options and do not elect to terminate the contracts for convenience. We plan to submit additional contract and grant applications for further support of our programs with various funding agencies;
- We have continued to use equity instruments to provide a portion of the compensation due to vendors and collaboration partners and expect to continue to do so for the foreseeable future;
- We will continue to pursue Net Operating Loss (“NOL”) sales in the state of New Jersey pursuant to its Technology Business Tax Certificate Transfer Program if the program is available;
- We plan to pursue potential partnerships for pipeline programs. However, there can be no assurances that we can consummate such transactions;
- We have up to \$0.9 million remaining from the FBR Sales Agreement as of March 23, 2020 under the prospectus supplement updated October 3, 2018; and
- We may seek additional capital in the private and/or public equity markets, pursue government contracts and grants as well as business development activities, to continue our operations, respond to competitive pressures, develop new products and services, and to support new strategic partnerships. We are currently evaluating additional equity/debt financing opportunities on an ongoing basis and may execute them when appropriate. However, there can be no assurances that we can consummate such a transaction, or consummate a transaction at favorable pricing.

Expenditures

Under our budget and based upon our existing product development agreements and license agreements pursuant to letters of intent and option agreements, we expect our total research and development expenditures for the year ending December 31, 2020 to be approximately \$9.4 million before any contract or grant reimbursements, of which \$7.0 million relates to the Specialized BioTherapeutics business and \$2.4 million relates to the Public Health Solutions business. We anticipate contract and grant reimbursements for the same period of approximately \$2.5 million to offset research and development expenses in the Specialized BioTherapeutics and Public Health Solutions business segments.

The table below details our costs for research and development by program and amounts reimbursed for the years ended December 31, 2019 and 2018:

	<u>2019</u>	<u>2018</u>
Research & Development Expenses		
RiVax [®] & ThermoVax [®] Vaccines	\$ 466,899	\$ 448,039
SGX942 (Dusquetide)	5,550,746	3,834,306
SGX943	-	-
SGX301	1,620,707	2,026,442
Other	484,258	442,167
Total	<u>8,122,610</u>	<u>6,750,954</u>
Reimbursed under Government Contracts and Grants		
RiVax [®] & ThermoVax [®] Vaccines	2,746,877	3,868,634
SGX942	412,572	342,604
SGX943	13,058	-
SGX301	394,908	386,477
Total	<u>3,567,415</u>	<u>4,597,715</u>
Grand Total	<u>\$ 11,690,025</u>	<u>\$ 11,348,670</u>

Contractual Obligations

We have licensing fee commitments of approximately \$400,000 for the next four years for several licensing agreements with consultants and universities. Additionally, we have collaboration and license agreements, which upon clinical or commercialization success may require the payment of milestones of up to \$7.9 million and/or royalties up to 6% of net sales of covered products, if and when achieved. However, there can be no assurance that clinical or commercialization success will occur.

We currently lease approximately 6,200 square feet of office space at 29 Emmons Drive, Suite B-10 in Princeton, New Jersey pursuant to a lease that was amended in October 2017 and expires in October 2020. This office space currently serves as our corporate headquarters. The rent for the first 12 months was approximately \$11,367 per month, or approximately \$22.00 per square foot. The rent increased to approximately \$11,625 per month, or approximately \$22.50 per square foot, for the 12 months beginning November 1, 2018 and increased to approximately \$11,883 per month on November 1, 2019, or approximately \$23.00 per square foot which rate will continue for the remainder of the lease. Our office space is sufficient to satisfy our current needs.

On September 3, 2014, we entered into an asset purchase agreement with Hy Biopharma, Inc. ("Hy Biopharma") pursuant to which we acquired certain intangible assets, properties and rights of Hy Biopharma related to the development of Hy BioPharma's synthetic hypericin product. As consideration for the assets acquired, we initially paid \$275,000 in cash and issued 184,912 shares of common stock with a fair value based upon our stock price on the date of grant of \$3,750,000. These amounts were charged to research and development expense during the third quarter of 2014 as the assets will be used in our research and development activities and do not have alternative future use pursuant to generally accepted accounting principles in the U.S. Provided the final success-oriented milestone is attained, we will be required to make a payment of up to \$5.0 million, if and when achieved. The potential future payment will be payable in our common stock, not to exceed 19.9% of our outstanding stock. As of December 31, 2019, no milestone payments have been made or accrued. In March 2020, we issued 1,956,182 shares of common stock at a value of \$5,000,000 (based upon an effective per share price of \$2.56) as a result of SGX301 demonstrating a statistically significant treatment response in the Phase 3 clinical trial.

In January 2020, our Board of Directors authorized an amendment to Dr. Schaber’s employment agreement to increase the number of shares of common stock from 5,000 to 500,000, issuable to Dr. Schaber immediately prior to the completion of a transaction, or series or a combination of related transactions, negotiated by our Board of Directors whereby, directly or indirectly, a majority of our capital stock or a majority of our assets are transferred from us and/or our stockholders to a third party.

As a result of the above agreements, we have future contractual obligations over the next five years as follows:

Year	Licensing Fee	Property and Other Leases	Total
2020	\$ 100,000	\$ 127,377	\$ 227,377
2021	100,000	6,408	106,408
2022	100,000	-	100,000
2023	100,000	-	100,000
Total	\$ 400,000	\$ 133,785	\$ 533,785

Item 8. Financial Statements and Supplementary Data

The information required by this Item 8 is contained on pages F-1 through F-23 of this Annual Report on Form 10-K and is incorporated herein by reference.

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

None.

Item 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

Disclosure controls and procedures are our controls and other procedures that are designed to ensure that information required to be disclosed by us in the reports that we file or submit under the Securities Exchange Act of 1934, as amended (the “Exchange Act”) is recorded, processed, summarized and reported within the time periods specified in the SEC’s rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by us in the reports that we file under the Exchange Act is accumulated and communicated to our management, including our principal executive officer and principal financial officer, as appropriate, to allow timely decisions regarding required disclosure. Our management recognizes that any controls and procedures, no matter how well designed and operated, can only provide reasonable assurance of achieving their objectives and management necessarily applies its judgment in evaluating the possible controls and procedures.

Our management has evaluated, with the participation of our principal executive officer and principal financial officer, the effectiveness of our disclosure controls and procedures (as such term is defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) as of the end of the period covered by this report. Based upon that evaluation, our management, including our principal executive officer and principal financial officer, has concluded that, as of the end of the period covered by this report, our disclosure controls and procedures were effective at the reasonable assurance level.

Management's Annual Report on Internal Control over Financial Reporting

Company management is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is a process designed by, or under the supervision of, our principal executive and principal financial officers and effected by our Board of Directors, management and other personnel to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles and includes those policies and procedures that:

- pertain to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of our assets;
- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that our receipts and expenditures are being made only in accordance with authorizations of management and directors; and
- provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of our assets that could have a material effect on the financial statements.

Because of inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Projections of any evaluation of effectiveness to future periods are subject to the risks that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Management assessed the effectiveness of our internal control over financial reporting as of December 31, 2019. In making this assessment, management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO") in *Internal Control-Integrated Framework, 2013*.

Based on our assessment, management has concluded that, as of December 31, 2019, our internal control over financial reporting is effective.

Changes in Internal Control over Financial Reporting

There were no changes in our internal control over financial reporting identified in connection with the evaluation of such internal control that occurred during our last fiscal quarter that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The table below contains information regarding the current members of the Board of Directors and executive officers. The ages of individuals are provided as of March 23, 2020:

Name	Age	Position
Christopher J. Schaber, PhD	53	Chairman of the Board, Chief Executive Officer and President
Gregg A. Lapointe, CPA, MBA	61	Director
Diane L Parks, MBA	67	Director
Mark Pearson	54	Director
Robert J. Rubin, MD	74	Director
Jerome B. Zeldis, MD, PhD	69	Director
Jonathan Guarino, CPA, CGMA	47	Chief Financial Officer, Senior Vice President and Corporate Secretary
Oreola Donini, PhD	48	Chief Scientific Officer and Senior Vice President
Richard Straube, MD	68	Chief Medical Officer and Senior Vice President

Christopher J. Schaber, PhD has over 30 years of experience in the pharmaceutical and biotechnology industry. Dr. Schaber has been our President and Chief Executive Officer and a director since August 2006. He was appointed Chairman of the Board on October 8, 2009. He also has served on the board of directors of the Biotechnology Council of New Jersey (“BioNJ”) since January 2009 and the Alliance for Biosecurity since October 2014, and has been a member of the corporate councils of both the National Organization for Rare Diseases (“NORD”) and the American Society for Blood and Marrow Transplantation (“ASBMT”) since October 2009 and July 2009, respectively. Prior to joining Soligenix, Dr. Schaber served from 1998 to 2006 as Executive Vice President and Chief Operating Officer of Discovery Laboratories, Inc., where he was responsible for overall pipeline development and key areas of commercial operations, including regulatory affairs, quality control and assurance, manufacturing and distribution, pre-clinical and clinical research, and medical affairs, as well as coordination of commercial launch preparation activities. From 1996 to 1998, Dr. Schaber was a co-founder of Acute Therapeutics, Inc., and served as its Vice President of Regulatory Compliance and Drug Development. From 1994 to 1996, Dr. Schaber was employed by Ohmeda PPD, Inc., as Worldwide Director of Regulatory Affairs and Operations. From 1989 to 1994, Dr. Schaber held a variety of regulatory, development and operations positions with The Liposome Company, Inc., and Elkins-Sinn Inc., a division of Wyeth-Ayerst Laboratories. Dr. Schaber received his BA degree from Western Maryland College, his MS degree in Pharmaceutics from Temple University School of Pharmacy and his PhD degree in Pharmaceutical Sciences from the Union Graduate School. Dr. Schaber was selected to serve as a member of our Board of Directors because of his extensive experience in drug development and pharmaceutical operations, including his experience as an executive senior officer with our Company and Discovery Laboratories, Inc., and as a member of the board of directors of BioNJ; because of his proven ability to raise funds and provide access to capital; and because of his advanced degrees in science and business.

Gregg A. Lapointe, CPA, MBA has been a director since March 2009. Mr. Lapointe is currently CEO of Cerium Pharmaceuticals, Inc. and serves on the Board of Directors of Rigel Pharmaceuticals, Inc., Cytori Therapeutics, Inc. and Catabasis Pharmaceuticals, Inc. Mr. Lapointe has previously served on the Board of Directors of ImmunoCellular Therapeutics Ltd., Raptor Pharmaceuticals, Inc., SciClone Pharmaceuticals, Inc., the Pharmaceuticals Research and Manufacturers of America (PhRMA), Questcor Pharmaceuticals, Inc. and the Board of Trustees of the Keck Graduate Institute of Applied Life Sciences. He previously served in varying roles for Sigma-Tau Pharmaceuticals, Inc. (now known as Lediant Biosciences, Inc.), a private biopharmaceutical company, from September 2001 through February 2012, including Chief Operating Officer from November 2003 to April 2008 and Chief Executive Officer from April 2008 to February 2012. From May, 1996 to August 2001, he served as Vice President of Operations and Vice President, Controller of AstenJohnson, Inc. (formerly JWI Inc.). Prior to that, Mr. Lapointe spent several years in the Canadian medical products industry in both distribution and manufacturing. Mr. Lapointe began his career at Price Waterhouse. Mr. Lapointe received his B.A. degree in Commerce from Concordia University in Montreal, Canada, a graduate diploma in Accountancy from McGill University and his M.B.A. degree from Duke University. He is a C.P.A. in the state of Illinois. Mr. Lapointe was selected to serve as a member of our Board of Directors because of his significant experience in the areas of global strategic planning and implementation, business development, corporate finance, and acquisitions, and his experience as an executive officer and board member in the pharmaceutical and medical products industries.

Diane L. Parks, MBA has been a director since July 2019. From February 2016 until July 2018, she served as Head of U.S. Commercial and Senior Vice President of Marketing, Sales & Market Research at Kite Pharma, Inc., a biopharma company developing cancer immunotherapy products with a primary focus on genetically engineered autologous T cell therapy with chimeric antigen receptors. From October 2014 to October 2015, Ms. Parks served as Vice President of Global Marketing at Pharmacyclics LLC, a biopharmaceutical company primarily focused on the development of cancer therapies. Prior to Pharmacyclics LLC, Ms. Parks held senior leadership roles as Vice President of Sales for Amgen, Inc., a biopharmaceutical company, representing oncology and nephrology products, and Senior Vice President of Specialty Biotherapeutics and Managed Care at Genentech, Inc., a biotechnology company that discovers, develops, manufactures and commercializes medicines to treat patients with serious or life-threatening medical conditions that was acquired by Roche Holding AG in 2009. At Genentech, she led the launches of multiple products as well as commercial development of Lucentis® and Rituxan®. Since May 2019, she has been a member of the board of directors of Calliditas Therapeutics AB (publ), a biopharmaceutical company, the shares of which are traded on the Nasdaq Stockholm Exchange, that is developing and commercializing pharmaceutical products for patients with significant unmet medical needs in niche indications. Since July 2018, Ms. Parks has been a member of the board of managers of Healogix LLC, a global marketing research-based consultancy that helps pharmaceutical and biotechnology companies achieve successful product development and commercial clarity. Ms. Parks holds a BS from Kansas State University and an MBA in marketing from Georgia State University. She has been a commercial leader in the biotech and pharma industry for over 30 years. Ms. Parks was selected to serve as a member of our Board of Directors because of her over 30 years' experience as a businesswoman and commercial executive with an extensive record of driving profitable growth for large pharmaceutical and biotech companies.

Mark Pearson has been a director since July 2018. In January 2017, Mr. Pearson founded and since inception has served as General Partner and CEO of Altamont Pharmaceutical Holdings, LLC, a privately-held investment company with over \$100 million invested in more than 20 life science companies. In February 2008, Mr. Pearson co-founded and since inception has served as General Partner of Annex Ventures, LLC, a privately-held investment company providing financing and value-added services to individual entrepreneurs and start-up companies in the high-tech, biotechnology and medical device markets. Mr. Pearson is also the co-founder and vice-chairman of Drawbridge Realty Management, LLC a real estate development and investment company which owns over 4.5 million square feet of commercial real estate leased to technology and life science companies predominantly in the western U.S. Previously, Mr. Pearson was the co-founder and Managing Partner of CRESA Partners LLC, a 57-office national corporate real estate firm. Since February 2009, he has served on the Board of Trustees of The Scripps Research Institute. Mr. Pearson holds a Bachelor of Science degree in Economics from the University of San Francisco and a Master's degree from the Stanford University Graduate School of Business. Mr. Pearson was selected to serve as a member of our Board of Directors because of his significant experience in the areas of corporate finance, business development and acquisitions and divestitures and his experience as an investor in the high-tech, biotechnology and medical device markets.

Robert J. Rubin, MD has been a director since October 2009. Dr. Rubin was a clinical professor of medicine at Georgetown University from 1995 until 2012 when he was appointed a Distinguished Professor of Medicine. From 1987 to 2001, he was president of the Lewin Group (purchased by Quintiles Transnational Corp. in 1996), an international health policy and management consulting firm. From 1994 to 1996, Dr. Rubin served as Medical Director of ValueRx, a pharmaceutical benefits company. From 1992 to 1996, Dr. Rubin served as President of Lewin-VHI, a health care consulting company. From 1987 to 1992, he served as President of Lewin-ICF, a health care consulting company. From 1984 to 1987, Dr. Rubin served as a principal of ICF, Inc., a health care consulting company. From 1981 to 1984, Dr. Rubin served as the Assistant Secretary for Planning and Evaluation at the Department of Health and Human Services and as an Assistant Surgeon General in the U.S. Public Health Service. Dr. Rubin has served on the Board of BioTelemetry, Inc. (formerly known as CardioNet, Inc.) since 2007. He is a board certified nephrologist and internist. Dr. Rubin received an undergraduate degree in Political Science from Williams College and his medical degree from Cornell University Medical College. Dr. Rubin was selected to serve as a member of our Board of Directors because of his vast experience in the health care industry, including his experience as a nephrologist, internist, clinical professor of medicine and Assistant Surgeon General, and his business experience in the pharmaceutical industry.

Jerome B. Zeldis, MD, PhD has been a director since June 2011. Dr. Zeldis is currently Chief Medical Officer and President of Clinical Research, Drug Safety and Regulatory of Sorrento Therapeutics, Inc. He is also Chief Medical Officer and Principal at Celularity, Inc. Previously, Dr. Zeldis was Chief Executive Officer of Celgene Global Health and Chief Medical Officer of Celgene Corporation, a publicly traded, fully integrated biopharmaceutical company. He was employed by Celgene from 1997 to 2016. From September 1994 to February 1997, Dr. Zeldis worked at Sandoz Research Institute and the Janssen Research Institute in both clinical research and medical development. He has been a board member of several biotechnology companies and is currently on the boards of Metastat, Inc., PTC Therapeutics Inc., BioSig Technologies, Inc., the Castleman's Disease Organization and Alliqua, Inc. He has previously served on the boards of the NJ Chapter of the Arthritis Foundation and PTC Therapeutics, Inc. Additionally, he has served as Assistant Professor of Medicine at the Harvard Medical School (from July 1987 to September 1988), Associate Professor of Medicine at University of California, Davis from (September 1988 to September 1994), Clinical Associate Professor of Medicine at Cornell Medical School (January 1995 to December 2003) and Professor of Clinical Medicine at the Robert Wood Johnson Medical School (July 1998 to June 2010). Dr. Zeldis received a BA and an MS from Brown University, and an MD, and a PhD in Molecular Biophysics and Biochemistry from Yale University. Dr. Zeldis trained in Internal Medicine at the UCLA Center for the Health Sciences and in Gastroenterology at the Massachusetts General Hospital and Harvard Medical School. Dr. Zeldis was selected to serve as a member of our Board of Directors because of his experience as an executive officer of a publicly traded biopharmaceutical company and in clinical research and medical development, and his experience in the health care industry, including his experience as an internist, gastroenterologist and professor of medicine.

Jonathan Guarino, CPA, CGMA has been with our company since September 2019 and is currently our Senior Vice President and Chief Financial Officer. Mr. Guarino has had significant experience with both development-stage and commercial companies. From September 2016 to July 2019, he served as Corporate Controller for Hepion Pharmaceuticals, Inc. (formerly ContraVir Pharmaceuticals, Inc.), a New Jersey-based public biotechnology company, where he contributed to the establishment of the financial infrastructure, as well as assisted with capital fund-raising and debt financings. He worked as Controller for Suite K Value Added Services LLC from August 2015 to September 2016 and as a senior manager of technical accounting for Covance, Inc., from June 2014 to May 2015. Prior to these positions, he held accounting and finance positions of increasing importance with several companies, including PricewaterhouseCoopers LLP, BlackRock, Inc. and Barnes & Noble, Inc. Mr. Guarino is a CPA (certified public accountant) and CGMA (chartered global management accountant), who received his BS in Business from Montclair State University.

Oreola Donini, PhD, has been with our company since August 15, 2013 and is currently our Chief Scientific Officer and Senior Vice President, a position she has held since December 5, 2014. Dr. Donini served as our Vice President of Preclinical Research and Development from August 15, 2013 until December 4, 2014. She has more than 15 years' experience in drug discovery and preclinical development with start-up biotechnology companies. From 2012 to 2013, Dr. Donini worked with ESSA Pharma Inc. as Vice President Research and Development. From 2004 to 2013, Dr. Donini worked with Inimex Pharmaceuticals Inc. ("Inimex"), lastly as Senior Director of Preclinical R&D from 2007-2013. Prior to joining Inimex, she worked with Kinetek Pharmaceuticals Inc., developing therapies for infectious disease, cancer and cancer supportive care. Dr. Donini is a co-inventor and leader of our SGX94 innate defense regulator technology, developed by Inimex and subsequently acquired by us. She was responsible for overseeing the manufacturing and preclinical testing of SGX94, which demonstrated efficacy in combating bacterial infections and mitigating the effects of tissue damage due to trauma, infection, radiation and/or chemotherapy treatment. These preclinical studies resulted in a successful Phase 1 clinical study and clearance of Phase 2 protocols for oral mucositis in head and neck cancer and acute bacterial skin and skin structure infections. While with ESSA Pharma Inc. as the Vice President of Research and Development, Dr. Donini led the preclinical testing of a novel N-terminal domain inhibitor of the androgen receptor for the treatment of prostate cancer. While with Kinetek Pharmaceuticals Inc., her work related to the discovery of novel kinase and phosphatase inhibitors for the treatment of cancer. Dr. Donini received her PhD from Queen's University in Kingston, Ontario, Canada and completed her post-doctoral work at the University of California, San Francisco. Her research has spanned drug discovery, preclinical development, manufacturing and clinical development in infectious disease, cancer and cancer supportive care.

Richard Straube, MD has been with our company since January 2014 and is currently our Senior Vice President and Chief Medical Officer. Dr. Straube is a board-certified pediatrician with 36 years' experience in both academia and industry, including clinical research experience in host-response modulation. From 2009 until joining our company, he was Chief Medical Officer of Stealth Peptides Incorporated, a privately-held, clinical stage, biopharmaceutical company. Prior to joining us, Dr. Straube served from 1988 to 1993 in various capacities, including most recently as Senior Director, Infectious Diseases and Immunology, Clinical Research, for Centocor, Inc., a privately-held biopharmaceutical company focused on developing monoclonal antibody-based diagnostics. While at Centocor, Inc., Dr. Straube was responsible for the initial anti-cytokine and anti-endotoxin programs targeted at ameliorating inappropriate host responses to infectious and immunologic challenges. Programs that he managed at Centocor, Inc. include assessments of immunomodulation using monoclonal removal of inciting molecular triggers, removal of internal immune-messengers, augmentation of normal host defenses, and maintenance of normal sub-cellular function in the face of injury. From 1993 to 1995, Dr. Straube was Director of Medical Affairs at T-cell Sciences, Inc., a privately-held biotechnology company. From 1995 to 1997, he was Director of Clinical Investigations of the Pharmaceutical Products Division of Ohmeda Corp., a privately-held biopharmaceutical company. He served from 1998 to 2007 as Executive Vice President of Research and Development and Chief Scientific Officer at INO Therapeutics LLC, a privately-held biotherapeutics company, where he was responsible for the clinical trials and subsequent approval of inhaled nitric oxide for the treatment of persistent pulmonary hypertension of the newborn. From 2007 to 2009, Dr. Straube was the Chief Medical Officer at Critical Biologics Corporation, a privately-held biotechnology company. Dr. Straube received his medical degree and residency training at the University of Chicago, completed a joint adult and pediatrician infectious diseases fellowship at the University of California, San Diego ("UCSD"), and as a Milbank Scholar completed training in clinical trial design at the London School of Hygiene and Tropical Medicine. While on the faculty at the UCSD Medical Center, his research focused on interventional studies for serious viral infections.

Board Leadership Structure

Our Board of Directors believes that Dr. Schaber's service as both the Chairman of our Board of Directors and our Chief Executive Officer is in the best interest of our Company and our stockholders. Dr. Schaber possesses detailed and in-depth knowledge of the issues, opportunities and challenges facing our Company and our business and, therefore, is best positioned to develop agendas that ensure that the Board of Directors' time and attention are focused on the most important matters. His combined role enables decisive leadership, ensures clear accountability, and enhances our ability to communicate our message and strategy clearly and consistently to our stockholders, employees, and collaborative partners.

Mr. Lapointe, Ms. Parks, Mr. Pearson, Dr. Rubin, and Dr. Zeldis are independent and the Board of Directors believes that the independent directors provide effective oversight of management. Moreover, in addition to feedback provided during the course of meetings of the Board of Directors, the independent directors hold executive sessions. Following an executive session of independent directors, the independent directors' report back to the full Board of Directors regarding any specific feedback or issues, provide the Chairman with input regarding agenda items for Board of Directors and Committee meetings, and coordinate with the Chairman regarding information to be provided to the independent directors in performing their duties. The Board of Directors believes that this approach appropriately and effectively complements the combined Chairman/Chief Executive Officer structure.

Although we believes that the combination of the Chairman and Chief Executive Officer roles is appropriate under the current circumstances, our corporate governance guidelines do not establish this approach as a policy, and the Board of Directors may determine that it is more appropriate to separate the roles in the future.

Committees of the Board of Directors

Our Board of Directors has the following three committees: (1) Compensation, (2) Audit and (3) Nominating and Corporate Governance. Our Board of Directors has adopted a written charter for each of these committees, which are available on our website at www.soligenix.com under the “Investors” section.

Director	Audit Committee	Compensation Committee	Nominating and Corporate Governance Committee
Gregg A. Lapointe, CPA	☐		☐
Diane L. Parks, MBA			☐
Mark E. Pearson	☐	☐	
Robert J. Rubin, MD	☐	☐	
Jerome B. Zeldis, MD, PhD		☐	☐

☐ – Committee Chair
 ☐ – Member

Audit Committee

Our Board of Directors has an Audit Committee, which is comprised of Mr. Lapointe (Chair), Mr. Pearson and Dr. Rubin. The Audit Committee assists our Board of Directors in monitoring the financial reporting process, the internal control structure and the independent registered public accountants. Its primary duties are to serve as an independent and objective party to monitor the financial reporting process and internal control system, to review and appraise the audit effort of the independent registered public accountants and to provide an open avenue of communication among the independent registered public accountants, financial and senior management, and our Board of Directors. Our Board of Directors has determined that Mr. Lapointe, Mr. Pearson and Dr. Rubin are “independent” directors, within the meaning of applicable listing standards of The Nasdaq Stock Market LLC (“Nasdaq”) and the Exchange Act and the rules and regulations thereunder. Our Board of Directors has also determined that the members of the Audit Committee are qualified to serve on the committee and have the experience and knowledge to perform the duties required of the committee and that Mr. Lapointe qualifies as an “audit committee financial expert” as that term is defined in the applicable regulations of the Exchange Act.

Compensation Committee

Our Board of Directors has a Compensation Committee, which is comprised of Dr. Rubin (Chair), Mr. Pearson and Dr. Zeldis. The Compensation Committee is responsible for reviewing and approving the executive compensation program, assessing executive performance, setting salary, making grants of annual incentive compensation and approving certain employment agreements. Our Board of Directors has determined that Dr. Rubin, Mr. Pearson and Dr. Zeldis are “independent” directors within the meaning of applicable listing standards of Nasdaq and the Exchange Act and the rules and regulations thereunder.

Nominating and Corporate Governance Committee

Our Board of Directors has a Nominating and Corporate Governance Committee (“Nominating Committee”), which is comprised of Dr. Zeldis (Chair), Mr. Lapointe and Ms. Parks. The Nominating Committee makes recommendations to the Board of Directors regarding the size and composition of our Board of Directors, establishes procedures for the nomination process, identifies and recommends candidates for election to our Board of Directors. Our Board of Directors has determined that Dr. Zeldis, Mr. Lapointe and Ms. Parks are “independent” directors, as such term is defined by the applicable Nasdaq listing standards.

Code of Ethics

We have adopted a code of ethics that applies to all of our executive officers and senior financial officers (including our chief executive officer, chief financial officer, chief accounting officer and any person performing similar functions). A copy of our code of ethics is publicly available on our website at www.soligenix.com under the “Investors” section. If we make any substantive amendments to our code of ethics or grant any waiver, including any implicit waiver, from a provision of the code to our chief executive officer, chief financial officer or chief accounting officer, we will disclose the nature of such amendment or waiver in a Current Report on Form 8-K.

Diversity Considerations in Identifying Director Nominees

We do not have a formal diversity policy or set of guidelines in selecting and appointing directors that comprise our Board of Directors. However, when making recommendations to our Board of Directors regarding the size and composition of our Board of Directors, our Nominating Committee does consider each individual director's qualifications, skills, business experience and capacity to serve as a director and the diversity of these attributes for the Board of Directors as a whole.

Compensation Committee Interlocks and Insider Participation

No member of our Compensation Committee is or has at any time during the past year been one of our officers or employees. None of our executive officers currently serves or in the past year has served as a member of the Board of Directors or Compensation Committee of any entity that has one or more executive officers serving on our Board of Directors or Compensation Committee.

Item 11. Executive Compensation

In 2018, in furtherance of our compensation philosophy and objectives, the Compensation Committee engaged the Setren Smallberg & Associates ("SS&A"), an outside executive compensation consulting firm determined to be independent by the Compensation Committee, to conduct a review of, and recommend changes to, our compensation program for our most highly compensated executive officers. A representative of SS&A attended Compensation Committee meetings at the invitation of the Compensation Committee Chairman and was also in direct contact with the Compensation Committee and company management from time to time. SS&A provided the Compensation Committee with assistance and advice in the review of our salary structure, annual and equity incentive awards and other related executive pay issues. In addition, SS&A provided advice regarding marketplace trends and best practices relating to competitive pay levels.

SS&A did not provide any services to us other than its services as the Compensation Committee's independent compensation consultant, and SS&A did not receive any fees or compensation from us other than the fee it received as the independent compensation consultant. Except as described above, SS&A did not provide any services to us in 2018 or 2019. The Compensation Committee confirmed that SS&A's work for the Compensation Committee did not create any conflicts of interest.

Summary Compensation

The following table contains information concerning the compensation paid during each of the two years ended December 31, 2019 and 2018, respectively to our Chief Executive Officer and each of the three other most highly compensated executive officers (collectively, the “Named Executive Officers”).

Summary Compensation

<u>Name</u>	<u>Position</u>	<u>Year</u>	<u>Salary</u>	<u>Bonus</u>	<u>Option Awards</u>	<u>All Other Compensation</u>	<u>Total</u>
Christopher J. Schaber ⁽¹⁾	CEO & President	2019	\$ 466,117	\$ 111,868	\$ 83,415	\$ 26,749	\$ 688,149
		2018	\$ 452,541	\$ 94,128	\$ 39,142	\$ 32,781	\$ 618,592
Jonathan Guarino ⁽²⁾	CFO & Senior VP	2019	\$ 68,750	\$ 13,041	\$ 32,255	\$ 8,437	\$ 122,483
Karen Krumeich ⁽³⁾	Former CFO & Senior VP	2019	\$ 163,555	\$ -	\$ -	\$ 6,360	\$ 169,915
		2018	\$ 230,969	\$ 40,604	\$ 26,095	\$ 11,324	\$ 308,992
Oreola Donini ⁽⁴⁾	CSO & Senior VP	2019	\$ 241,500	\$ 47,817	\$ 45,164	\$ 4,619	\$ 339,100
		2018	\$ 230,000	\$ 41,124	\$ 26,095	\$ 4,619	\$ 301,838
Richard C. Straube ⁽⁵⁾	CMO & Senior VP	2019	\$ 212,352	\$ 30,090	\$ 22,582	\$ 13,636	\$ 278,659
		2018	\$ 329,521	\$ 53,975	\$ 26,095	\$ 22,116	\$ 431,707

(1) Dr. Schaber deferred the payment of his 2019 bonus of \$111,868 until January 15, 2020. Option awards figure includes the value of Common Stock option awards at grant date as calculated under FASB ASC 718. Other compensation represents health insurance costs paid by us.

(2) Mr. Guarino deferred the payment of his 2019 bonus of \$13,041 until January 15, 2020. Option awards figure includes the value of Common Stock option awards at grant date as calculated under FASB ASC 718. Other compensation represents health insurance costs paid by us. Mr. Guarino joined the Company on September 9, 2019.

(3) Ms. Krumeich had zero deferred payments on bonus for 2019. Option awards figures include the value of Common Stock option awards at grant date as calculated under FASB ASC 718. Other compensation represents health insurance costs paid by us. Effective September 6, 2019, Ms. Krumeich resigned from the Company.

(4) Dr. Donini deferred the payment of her 2019 bonus of \$47,817 until January 15, 2020. Option awards figure includes the value of Common Stock option awards at grant date as calculated under FASB ASC 718. Other compensation represents health insurance costs paid by us.

(5) Dr. Straube deferred the payment of his 2019 bonus of \$30,090 until January 15, 2020. Option awards figure includes the value of Common Stock option awards at grant date as calculated under FASB ASC 718. Other compensation represents health insurance costs paid by us.

Employment and Severance Agreements

In August 2006, we entered into a three-year employment agreement with Christopher J. Schaber, PhD. Pursuant to this employment agreement we agreed to pay Dr. Schaber a base salary of \$300,000 per year and a minimum annual bonus of \$100,000. Dr. Schaber’s employment agreement automatically renews every three years, unless otherwise terminated, and was automatically renewed in December 2007, December 2010, December 2013 and December 2016 for an additional term of three years. We agreed to issue him options to purchase 12,500 shares of our common stock, with one third immediately vesting and the remainder vesting over three years. Upon termination without “Just Cause” as defined by this agreement, we would pay Dr. Schaber nine months of severance, as well as any accrued bonuses, accrued vacation, and we would provide health insurance and life insurance benefits for Dr. Schaber and his dependents. No unvested options shall vest beyond the termination date. Dr. Schaber’s monetary compensation (base salary of \$300,000 and bonus of \$100,000) remained unchanged from 2006 with the 2007 renewal. Upon a change in control of the company due to merger or acquisition, all of Dr. Schaber’s options shall become fully vested, and be exercisable for a period of five years after such change in control (unless they would have expired sooner pursuant to their terms). In the event of his death during the term of the agreement, all of his unvested options shall immediately vest and remain exercisable for the remainder of their term and become the property of Dr. Schaber’s immediate family.

In January 2020, our Board of Directors authorized an amendment to Dr. Schaber's employment agreement to increase the number of shares of common stock from 5,000 to 500,000, issuable to Dr. Schaber immediately prior to the completion of a transaction or series or a combination of related transactions negotiated by our Board of Directors whereby, directly or indirectly, a majority of our capital stock or a majority of our assets are transferred from us and/or our stockholders to a third party.

On June 22, 2011, the Compensation Committee eliminated his fixed minimum annual bonus payable and revised it to an annual targeted bonus of 40% of his annual base salary. On December 7, 2017, the Compensation Committee approved an increase in salary for Dr. Schaber to \$452,541. On December 13, 2018, the Compensation Committee approved an increase in salary for Dr. Schaber to \$466,117. On December 12, 2019, the Compensation Committee approved an increase in salary for Dr. Schaber to \$475,439.

In July 2013, we entered into a one-year employment agreement with Oreola Donini, PhD, our Vice President Preclinical Research & Development. Pursuant to the agreement, we have agreed to pay Dr. Donini \$170,000 (CAD) per year and a targeted annual bonus of 20% of base salary. We also agreed to issue her options to purchase 40,000 shares of our common stock with one-quarter immediately vesting and the remainder vesting over three years. Dr. Donini's employment agreement automatically renews each year, unless otherwise terminated, and has automatically renewed each year since execution. Upon termination without "Just Cause", as defined in Dr. Donini's employment agreement, we would pay Dr. Donini three months of severance, accrued bonuses and vacation, and health insurance benefits. No unvested options vest beyond the termination date. In December 2014, Dr. Donini was named Chief Scientific Officer and Senior Vice President. Upon Dr. Donini's promotion to Chief Scientific Officer, the Compensation Committee increased her targeted bonus to 30% of her annual base salary. On December 7, 2017, the Compensation Committee approved an increase in salary for Dr. Donini to \$230,000. On December 13, 2018, the Compensation Committee approved an increase in salary for Dr. Donini to \$241,500. On December 12, 2019, the Compensation Committee approved an increase in salary for Dr. Donini to \$248,745.

On June 16, 2016, we entered into a one-year employment agreement with Karen Krumeich, our former Senior Vice President and Chief Financial Officer. Pursuant to the agreement, we agreed to pay Ms. Krumeich \$222,000 per year and a targeted annual bonus of 30% of base salary. We also agreed to issue her options to purchase 10,000 shares of our common stock with one-quarter immediately vesting and the remainder vesting over three years. Ms. Krumeich's employment agreement automatically renewed each year, until Ms. Krumeich resigned from the Company effective September 6, 2019. On December 14, 2016, the Compensation Committee approved an increase in salary for Ms. Krumeich to \$226,440. On December 7, 2017, the Compensation Committee approved an increase in salary for Ms. Krumeich to \$230,969. On December 13, 2018, the Compensation Committee approved an increase in salary for Ms. Krumeich to \$237,898.

In December 2014, we entered into a one-year employment agreement with Richard C. Straube, MD, our Chief Medical Officer and Senior Vice President. Pursuant to the agreement, we agreed to pay Dr. Straube \$300,000 per year and a targeted annual bonus of 30% of base salary. We also issued him options to purchase 10,000 shares of our common stock with one-third immediately vesting and the remainder vesting over three years. On March 26, 2019, we entered into an amendment to our employment agreement with Dr. Straube. Pursuant to the amended agreement, which amendment becomes effective as of April 1, 2019, Dr. Straube will be required to devote at least 20 hours per week to the performance of his duties and we will pay him \$170,000 per year. The amended employment agreement automatically renews each year, unless otherwise terminated. Upon termination without "Just Cause", as defined in the amended employment agreement, we would pay Dr. Straube one month of severance. No unvested options vest beyond the termination date. On December 7, 2017, the Compensation Committee approved an increase in salary for Dr. Straube to \$329,521. On December 13, 2018, the Compensation Committee approved an increase in salary for Dr. Straube to \$339,407. On December 12, 2019, the Compensation Committee approved an increase in salary for Dr. Straube to \$173,400.

On September 9, 2019, we entered into a one-year employment agreement with Jonathan Guarino, CPA, CGMA, our Senior Vice President and Chief Financial Officer. Pursuant to the agreement, we have agreed to pay Mr. Guarino \$220,000 per year and a targeted annual bonus of 30% of base salary. We also agreed to issue him options to purchase 40,000 shares of our common stock with one-quarter immediately vesting and the remainder vesting over three years. Mr. Guarino's employment agreement automatically renews each year, unless otherwise terminated. Upon termination without "Just Cause", as defined in Mr. Guarino's employment agreement, we would pay Mr. Guarino three months of severance, accrued salary, bonuses and vacation, and health insurance benefits. No unvested options vest beyond the termination date.

Outstanding Equity Awards at Fiscal Year-End

The following table contains information concerning unexercised options, stock that has not vested, and equity incentive plan awards for the Named Executive Officers outstanding at December 31, 2019, as adjusted for the reverse stock split of one-for-ten effective October 7, 2016. We have never issued Stock Appreciation Rights.

Name	Number of Securities Underlying Unexercised Options (#)		Equity Incentive Plan Awards: Number of Securities Underlying Unexercised	Option Exercise Price (\$)	Option Expiration Date
	Exercisable	Unexercisable	Options (#)		
	Christopher J. Schaber	11,000	-		
	11,219	-	-	\$ 6.40	11/30/2021
	13,000	-	-	\$ 6.80	12/04/2022
	10,000	-	-	\$ 20.10	12/04/2023
	10,000	-	-	\$ 15.00	12/04/2024
	14,000	-	-	\$ 11.30	12/30/2025
	47,142	12,858	12,858	\$ 2.01	12/06/2027
	30,000	30,000	30,000	\$ 0.97	12/12/2028
	26,250	33,750	33,750	\$ 0.96	01/01/2029
	15,000	45,000	45,000	\$ 1.24	12/11/2029
Jonathan Guarino	12,500	27,500	27,500	\$ 0.97	09/08/2029
	2,500	7,500	7,500	\$ 1.24	12/11/2029
Oreola Donini	4,000	-	-	\$ 15.60	8/14/2023
	2,000	-	-	\$ 20.10	12/4/2023
	3,000	-	-	\$ 15.00	12/4/2024
	7,000	-	-	\$ 11.30	12/30/2025
	18,750	1,250	1,250	\$ 2.67	3/30/2027
	26,254	8,746	8,746	\$ 2.01	12/06/2027
	20,000	20,000	20,000	\$ 0.97	12/13/2028
	15,000	45,000	45,000	\$ 1.24	12/11/2029
Richard C. Straube	10,000	-	-	\$ 20.10	1/06/2024
	5,000	-	-	\$ 15.00	12/04/2024
	7,000	-	-	\$ 11.30	12/30/2025
	18,750	1,250	1,250	\$ 2.67	3/30/2027
	26,254	8,746	8,746	\$ 2.01	12/06/2027
	20,000	20,000	20,000	\$ 0.97	12/13/2028
	7,500	22,500	22,500	\$ 1.24	12/11/2029

Compensation of Directors

The following table contains information concerning the compensation of the non-employee directors during the year ended December 31, 2019.

Name	Fees Earned Paid in Cash¹	Option Awards²	Total
Gregg A. Lapointe	\$ 49,864	\$ 30,000	\$ 79,864
Keith Brownlie	\$ 37,663	\$ -	\$ 37,663
Diane L. Parks	\$ 18,410	\$ 31,305	\$ 49,715
Mark E. Pearson	\$ 42,364	\$ 30,000	\$ 72,364
Robert J. Rubin	\$ 52,500	\$ 30,000	\$ 82,500
Jerome B. Zeldis	\$ 50,000	\$ 30,000	\$ 80,000

¹ Directors who are compensated as full-time employees receive no additional compensation for service on our Board of Directors. Each independent director who is not a full-time employee is paid \$35,000 annually, on a prorated basis, for their service on our Board of Directors, the chairman of our Audit Committee is paid \$15,000 annually, on a prorated basis, and the chairmen of our Compensation and Nominating Committees is paid \$10,000 annually, on a prorated basis. Additionally, Audit Committee members are paid \$7,500 annually and Compensation and Nominating Committee members are paid \$5,000 annually. This compensation is paid quarterly. During July 2019, Ms. Parks was selected by the Nominating Committee and elected by the Board as a Director. Mr. Brownlie elected not to stand for re-election to the Board of Directors for the Annual meeting held on September 27, 2019.

² We maintain a stock option grant program pursuant to the nonqualified stock option plan, whereby members of our Board of Directors or its committees who are not full-time employees receive an initial grant of fully vested options to purchase 1,500 shares of common stock. Upon re-election to the Board, each Board member will receive stock options with a value of \$30,000, calculated using the closing price of the common stock on the trading day prior to the date of the annual meeting of our stockholders, which vest at the rate of 25% per quarter, commencing with the first quarter after each annual meeting of stockholders.

Stock Ownership Policy

In April 2012, our Board of Directors adopted a stock ownership policy applicable to our non-employee directors to strengthen the link between director and stockholder interests. Pursuant to the stock ownership policy, each non-employee director is required to hold a minimum ownership position in the common stock equal to the annual cash compensation paid for service on the Board of Directors, exclusive of cash compensation paid for service as a chair or member of any committees of the Board of Directors.

Stock counted toward the ownership requirement includes common stock held by the director, unvested and vested restricted stock, and all shares of common stock beneficially owned by the director held in a trust and by a spouse and/or minor children of the director. The policy provides that the ownership requirement must be attained within three years after the later of June 21, 2012 and the date a director is first elected or appointed to the Board of Directors. To monitor progress toward meeting the requirement, the Nominating Committee will review director ownership levels at the end of March of each year. Non-employee directors are prohibited from selling any shares of common stock unless such director is in compliance with the stock ownership policy. A copy of our director compensation and stock ownership policy is publicly available on our website at www.soligenix.com under the "Investors" section.

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

The table below provides information regarding the beneficial ownership of the common stock as of March 23, 2020, of (1) each person or entity who owns beneficially 5% or more of the shares of our outstanding common stock, (2) each of our directors, (3) each of the Named Executive Officers, and (4) our directors and officers as a group. Except as otherwise indicated, and subject to applicable community property laws, we believe the persons named in the table have sole voting and investment power with respect to all shares of common stock held by them.

Name of Beneficial Owner	Shares of Common Stock Beneficially Owned **	Percent of Class
Altamont Pharmaceutical Holdings, LLC ⁽¹⁾	2,500,000	9.70%
ACT Capital Management, LLLP ⁽²⁾	1,506,500	5.80%
Christopher J. Schaber ⁽³⁾	297,425	1.14%
Gregg A. Lapointe ⁽⁴⁾	64,544	*
Diane L. Parks ⁽⁵⁾	31,904	*
Mark E. Pearson ⁽¹⁾	2,534,928	9.82%
Robert J. Rubin ⁽⁶⁾	67,818	*
Jerome B. Zeldis ⁽⁷⁾	79,685	*
Jonathan Guarino ⁽⁸⁾	18,125	*
Oreola Donini ⁽⁹⁾	109,442	*
Richard Straube ⁽¹⁰⁾	102,317	*
All directors and executive officers as a group (10 persons)	3,306,186	12.48%

(1) Beneficial ownership for Mark E. Pearson and Altamont Pharmaceutical Holdings, LLC (“Altamont Pharmaceutical”), a company for which Mr. Pearson serves as general partner and chief executive officer, includes 2,330,000 shares of common stock purchased on July 2, 2018 in our registered direct offering, but does not include a warrant to purchase up to 932,000 shares of common stock held by Altamont Pharmaceutical. While the warrant currently is exercisable, it is subject to a blocker provision that prevents the holder from exercising the warrant if such holder would beneficially own in excess of 4.99% of the common stock following such exercise. Beneficial ownership for Mr. Pearson also includes an option to purchase 10,482 shares of common stock exercisable within 60 days of March 23, 2020. As general partner and chief executive officer of Altamont Pharmaceutical, Mr. Pearson exercises voting and dispositive control over the securities beneficially owned by Altamont Pharmaceutical, and therefore may be deemed to be the beneficial owner thereof; however, Mr. Pearson disclaims beneficial ownership of the securities beneficially owned by Altamont Pharmaceutical except to the extent of his pecuniary interest therein. The address of Altamont Pharmaceutical is 3031 Tisch Way, Suite 505, San Jose, CA 95128 and of Mr. Pearson is c/o Soligenix, 29 Emmons Drive, Suite B-10, Princeton, New Jersey 08540.

(2) On February 7, 2020, ACT Capital Management, LLLP, on behalf of itself and Amir L. Ecker and Carol G. Frankenfield, filed Amendment No. 4 to Schedule 13G with the SEC (as amended, the “Schedule 13G”). The Schedule 13G states that Amir L. Ecker and Carol G. Frankenfield are the General Partners of ACT Capital Management, LLLP and that investment decisions made on behalf of ACT Capital Management, LLLP are made primarily by its General Partners. The Schedule 13G indicates that (a) ACT Capital Management, LLLP has sole voting and dispositive power with respect to 277,500 shares and shared dispositive power with respect to 1,221,499 shares; (b) Amir L. Ecker has sole voting power with respect to 635,999 shares, shared voting power with respect to 358,999 shares and shared dispositive power with respect 1,221,499 shares and (c) Carol G. Frankenfield has shared voting power with respect to 377,500 shares and shared dispositive power with respect 1,221,499 shares. The address of the principal business office of ACT Capital Management, LLLP, Amir L. Ecker and Carol G. Frankenfield is 100 W. Lancaster Ave., Suite 110, Wayne, PA 19087.

(3) Includes 53,095 shares of common stock owned by Dr. Schaber, options to purchase 224,575 shares of common stock exercisable within 60 days of March 23, 2020 and warrants to purchase up to 19,755 shares of common stock exercisable within 60 days of March 23, 2020. The address of Dr. Schaber is c/o Soligenix, 29 Emmons Drive, Suite B-10, Princeton, New Jersey 08540.

(4) Includes 7,379 shares of Common Stock and options to purchase 57,1657 shares of Common Stock exercisable within 60 days of March 23, 2020. The address of Mr. Lapointe is c/o Soligenix, 29 Emmons Drive, Suite B-10, Princeton, New Jersey 08540.

- (5) Includes 14,940 shares of Common Stock and options to purchase 16,964 shares of Common Stock exercisable within 60 days of March 23, 2020. The address of Ms. Parks is c/o Soligenix, 29 Emmons Drive, Suite B-10, Princeton, New Jersey 08540.
- (6) Includes 4,385 shares of Common Stock, options to purchase 59,477 shares of Common Stock exercisable within 60 days of March 23, 2020, and warrants to purchase up to 3,956 shares of Common Stock exercisable within 60 days of March 23, 2020. The address of Dr. Rubin is c/o Soligenix, 29 Emmons Drive, Suite B-10, Princeton, New Jersey 08540.
- (7) Includes 22,917 shares of Common Stock and options to purchase 56,768 shares of Common Stock exercisable within 60 days of March 23, 2020. The address of Dr. Zeldis is c/o Soligenix, 29 Emmons Drive, Suite B-10, Princeton, New Jersey 08540.
- (8) Includes options to purchase 18,125 shares of Common Stock owned by Mr. Guarino exercisable within 60 days of March 23, 2020. The address of Mr. Guarino is c/o Soligenix, 29 Emmons Drive, Suite B-10, Princeton, New Jersey 08540.
- (9) Includes 102,317 options to purchase shares of Common Stock owned by Dr. Straube exercisable within 60 days of March 23, 2020. The address of Dr. Straube is c/o Soligenix, 29 Emmons Drive, Suite B-10, Princeton, New Jersey 08540.
- (10) Includes options to purchase 109,442 shares of Common Stock owned by Dr. Donini exercisable within 60 days of March 23, 2020. The address of Dr. Donini is c/o Soligenix, 29 Emmons Drive, Suite B-10, Princeton, New Jersey 08540.

* Indicates less than 1%.

** Beneficial ownership is determined in accordance with the rules of the SEC. Shares of Common Stock subject to options or warrants currently exercisable or exercisable within 60 days of March 23, 2020 are deemed outstanding for computing the percentage ownership of the stockholder holding the options or warrants, but are not deemed outstanding for computing the percentage ownership of any other stockholder. Percentage of ownership is based on 25,778,431 shares of Common Stock outstanding as of March 23, 2020.

Equity Compensation Plan Information

In December 2005, our Board of Directors approved the 2005 Equity Incentive Plan, which was approved by stockholders on December 29, 2005. In September 2013, our stockholders approved an amendment to the 2005 Equity Incentive Plan to increase the maximum number of shares of our common stock available for issuance under the plan by 125,000 shares, bringing the total shares reserved for issuance under the plan to 300,000 shares. In April 2015, our Board of Directors approved the 2015 Equity Incentive Plan (the "2015 Plan"), which was approved by stockholders on June 18, 2015. In June 2017, our stockholders approved an amendment to the 2015 Plan to increase the maximum number of shares of our Common Stock available for issuance under the plan to 600,000 shares. In September 2018, our stockholders approved a second amendment to the 2015 Plan to increase the maximum number of shares of our common stock available for issuance under the plan, bringing the total shares available for issuance under the plan to 1,000,000 shares. The following table provides information, as of December 31, 2019 with respect to options outstanding under our 2005 Equity Incentive Plan and our 2015 Plan. All share numbers in this paragraph and in the following table have been adjusted for the one-for-ten reverse stock split effective October 7, 2016.

Plan Category	Number of Securities to be Issued upon Exercise of Outstanding Options, Warrants and Rights	Weighted-Average Exercise Price of Outstanding Options, Warrants and Rights	Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans (excluding securities reflected in the first column)
Equity compensation plans approved by security holders ¹	1,506,972	\$ 3.77	663,709
Equity compensation plans not approved by security holders	-	-	-
Total	1,506,972	\$ 3.77	663,709

¹ Includes our 2005 Equity Incentive Plan and our 2015 Plan. Our 2005 Equity Incentive Plan expired in 2015 and thus no securities remain available for future issuance under that plan.

Item 13. Certain Relationships and Related Transactions and Director Independence

Related Party Transactions

Our audit committee is responsible for the review, approval and ratification of related party transactions. The audit committee reviews these transactions under our Code of Ethics, which governs conflicts of interests, among other matters, and is applicable to our employees, officers and directors.

We are party to a registration rights agreement with certain stockholders, including Altamont Pharmaceutical Holdings, LLC and ACT Capital Management, LLLP each of which beneficially owns 5% or more of the shares of our outstanding common stock. The agreement provides that the stockholders have the right to require that we register its shares under the Securities Act for sale to the public, subject to certain conditions. The stockholders also have piggyback registration rights, which means that, if not already registered, they have the right to include their shares in any registration that we effect under the Securities Act, subject to specified exceptions. We must pay all expenses incurred in connection with the exercise of these demand registration rights.

We are unable to estimate the dollar value of the registration rights to the holders of these rights. The amount of reimbursable expenses under the agreements depends on a number of variables, including whether registration rights are exercised incident to a primary offering by us, the form on which we are eligible to register such a transaction, and whether we have a shelf registration in place at the time of a future offering.

Other than as described above, the employment agreements and compensation paid to our directors, we did not engage in any transactions with related parties since January 1, 2018. For a discussion of our employment agreements and compensation paid to our directors, see “Item 11. Executive Compensation”.

Director Independence

The Board of Directors has determined that Mr. Lapointe, Ms. Parks, Dr. Rubin, and Dr. Zeldis are “independent” as such term is defined by the applicable listing standards of Nasdaq. Our Board of Directors based this determination primarily on a review of the responses of the Directors to questionnaires regarding their employment, affiliations and family and other relationships.

Item 14. Principal Accountant Fees and Services

The following table highlights the aggregate fees billed during each of the two years ended December 31, 2019 and December 31, 2018 by EisnerAmper LLP.

	2019	2018
Audit fees	\$ 146,490	\$ 178,800
Tax fees	12,250	9,890
Other fees	-	-
Total	\$ 158,740	\$ 188,690

Audit Fees

This category includes the fees for the examination of our consolidated financial statements, review of our Annual Report on Form 10-K and quarterly reviews of the interim financial statements included in our Quarterly Reports on Form 10-Q.

Tax Fees

This category relates to professional services for tax compliance, tax advice and tax planning.

Other Fees

Our principal accountants did not bill us for any services or products other than as reported above in this Item 14 during each of the two years.

Pre-Approval Policies and Procedures

The audit committee has adopted a policy that requires advance approval of all audit services and permitted non-audit services to be provided by the independent auditor as required by the Exchange Act. The audit committee must approve the permitted service before the independent auditor is engaged to perform it. The audit committee approved all of the services described above in accordance with its pre-approval policies and procedures.

Part IV

Item 15. Exhibits and Financial Statements Schedules

a. (1) Consolidated Financial Statements:

The financial statements required to be filed by Item 8 of this Annual Report on Form 10-K and filed in this Item 15, are as follows:

Consolidated Balance Sheets as of December 31, 2019 and 2018	F-2
Consolidated Statements of Operations for the Years Ended December 31, 2019 and 2018	F-3
Consolidated Statements of Comprehensive Loss for the Years Ended December 31, 2019 and 2018	F-4
Consolidated Statements of Shareholders' Equity for the Years Ended December 31, 2019 and 2018	F-5
Consolidated Statements of Cash Flows for the Years Ended December 31, 2019 and 2018	F-6
Notes to Consolidated Financial Statements	F-7 - F-22
Report of Independent Registered Public Accounting Firm	F-23

(2) Financial Statement Schedules

Schedules are omitted because they are not applicable, or are not required, or because the information is included in the consolidated financial statements and notes thereto.

(3) Exhibits:

2.1	Agreement and Plan of Merger, dated May 10, 2006 by and among the Company, Corporate Technology Development, Inc., Enteron Pharmaceuticals, Inc. and CTD Acquisition, Inc. (incorporated by reference to Exhibit 2.1 included in our Registration Statement on Form SB-2 (File No. 333-133975) filed on May 10, 2006).
3.1	Second Amended and Restated Certificate of Incorporation (incorporated by reference to Exhibit 3.1 included in our current report on Form 8-K filed on June 22, 2012).
3.2	By-laws (incorporated by reference to Exhibit 3.1 included in our Quarterly Report on Form 10-QSB, as amended, for the fiscal quarter ended June 30, 2003).
3.3	Certificate of Amendment to Second Amended and Restated Certificate of Incorporation (incorporated by reference to Exhibit 3.1 included in our current report on Form 8-K filed on June 22, 2016).
3.4	Certificate of Amendment to Second Amended and Restated Certificate of Incorporation (incorporated by reference to Exhibit 3.1 included in our current report on Form 8-K filed on October 7, 2016).
3.5	Certificate of Amendment to Second Amended and Restated Certificate of Incorporation (incorporated by reference to Exhibit 3.1 included in our current report on Form 8-K filed on June 14, 2017).
3.6	Certificate of Amendment to Second Amended and Restated Certificate of Incorporation (incorporated by reference to Exhibit 3.1 of our current report on Form 8-K filed on September 28, 2018).
4.1	Warrant Agency Agreement by and between the Company and American Stock Transfer & Trust Company, LLC (incorporated by reference to Exhibit 10.1 included in our current report on Form 8-K filed on December 16, 2016).
4.2	Representative's Warrant (incorporated by reference to Exhibit 4.15 included in our Registration Statement on Form S-1 (File No. 333-214038) filed on November 14, 2016).
4.3	Form of Warrant to be issued to Aegis Capital Corp. (incorporated by reference to Exhibit 4.1 included in our current report on Form 8-K filed on October 31, 2017).
4.4	Form of Warrant to be issued to each investor in the June 2018 registered public offering Form of Warrant to (incorporated by reference to Exhibit 4.8 included in our Amendment No. 2 to Registration Statement on Form S-1 (File No. 333-225226) filed on June 20, 2018).
4.5	Form of Representative's Warrant (incorporated by reference to Exhibit 4.9 included in our Amendment No. 1 to Registration Statement on Form S-1 (File No. 333-225226) filed on June 18, 2018).
4.6	Description of Securities. *

- 10.1 [License Agreement between the Company and the University of Texas Southwestern Medical Center \(incorporated by reference to Exhibit 10.9 included in our Annual Report on Form 10-KSB filed March 30, 2004, as amended, for the fiscal year ended December 31, 2004\).](#)
- 10.2 [2005 Equity Incentive Plan, as amended on September 25, 2013 \(incorporated by reference to Exhibit 10.1 included in our current report on Form 8-K filed on September 30, 2013\).](#) **
- 10.3 [Form S-8 Registration of Stock Options Plan dated December 30, 2005 \(incorporated by reference to our registration statement on Form S-8 filed on December 30, 2005\).](#)
- 10.4 [Form S-8 Registration of Stock Options Plan dated June 20, 2014 \(incorporated by reference to our registration statement on Form S-8 filed on June 20, 2014\).](#)
- 10.5 [Form S-8 Registration of Stock Options Plan dated December 11, 2015 \(incorporated by reference to our registration statement on Form S-8 filed on December 14, 2015\).](#)
- 10.6 [Employment Agreement dated December 27, 2007, between Christopher J. Schaber, PhD and the Company \(incorporated by reference to Exhibit 10.30 included in our Annual Report on Form 10-K for the fiscal year ended December 31, 2008\).](#) **
- 10.7 [Exclusive License Agreement dated November 24, 1998, between Enteron Pharmaceuticals, Inc. and George B. McDonald, MD and amendments \(incorporated by reference to Exhibit 10.42 included in our Registration Statement on Form S-1 \(File No. 333-157322\) filed on February 13, 2009\).](#)
- 10.8 [First Amendment to Employment Agreement dated as of July 12, 2011, between the Company and Christopher J. Schaber, PhD \(incorporated by reference to Exhibit 10.1 of our current report on Form 8-K filed on July 14, 2011\).](#) **
- 10.9 [Amendment to the Exclusive License Agreement dated as of July 26, 2011, between George McDonald, MD and the Company \(incorporated by reference to Exhibit 10.2 of our current report on Form 8-K filed on July 28, 2011\).](#)
- 10.10 [Amendment No. 2 to the Collaboration and Supply Agreement between the Company, Enteron and Sigma-Tau dated as of December 20, 2012 \(incorporated by reference to Exhibit 10.1 of our current report on Form 8-K filed on December 27, 2012\).](#) †
- 10.11 [Amendment to Exclusive License Agreement dated as of December 20, 2012 between Enteron and McDonald \(incorporated by reference to Exhibit 10.4 of our current report on Form 8-K filed on December 27, 2012\).](#)
- 10.12 [Amendment to Consulting Agreement dated as of December 20, 2012 between Enteron and McDonald \(incorporated by reference to Exhibit 10.5 of our current report on Form 8-K filed on December 27, 2012\).](#)
- 10.13 [Contract HHSO100201300023C dated September 18, 2013 between the Company and the U.S. Department of Health and Human Services Biomedical Advanced Research and Development Authority \(incorporated by reference to Exhibit 10.1 of our current report on Form 8-K filed on September 24, 2013\).](#) †
- 10.14 [Contract HHSN272201300030C dated September 24, 2013 by and between the Company and the National Institutes of Health \(incorporated by reference to Exhibit 10.1 of our current report on Form 8-K filed on September 30, 2013\).](#) †
- 10.15 [Employment Agreement dated as of January 6, 2014 between the Company and Richard Straube, M.D. \(incorporated by reference to Exhibit 10.1 of our current report on Form 8-K filed on January 8, 2014\).](#) **
- 10.16 [Asset Purchase Agreement dated September 3, 2014 between the Company and Hy Biopharma, Inc. \(incorporated by reference to Exhibit 10.1 of our current report on Form 8-K filed on September 5, 2014\).](#) †
- 10.17 [Registration Rights Agreement dated September 3, 2014 between the Company and Hy Biopharma, Inc. \(incorporated by reference to Exhibit 10.2 of our current report on Form 8-K filed on September 5, 2014\).](#)
- 10.18 [Contract HHSN272201400039C dated September 17, 2014 by and between the Company and the National Institutes of Health \(incorporated by reference to Exhibit 10.1 of our current report on Form 8-K filed on September 23, 2014\).](#) †
- 10.19 [Lease Agreement dated November 21, 2014, between the Company and CPP II, LLC \(incorporated by reference to Exhibit 10.42 included in our Annual Report on Form 10-K for the fiscal year ended December 31, 2014\).](#)

10.20	2015 Equity Incentive Plan, as amended on September 27, 2018 (incorporated by reference to Exhibit 10.1 of our current report on Form 8-K filed on September 28, 2018).
10.21	At Market Issuance Sales Agreement dated August 11, 2017 between Soligenix, Inc. and FBR Capital Markets & Co. (incorporated by reference to Exhibit 1.1 included in our Quarter Report on Form 10-Q for the fiscal quarter ended June 30, 2017).
10.22	Form of Registration Rights Agreement dated October 31, 2017 (incorporated by reference to Exhibit 10.3 included in our current report on Form 8-K filed on October 31, 2017).
10.23	First Amendment to Employment Agreement dated as of April 1, 2019 between the Company and Richard Straube, M.D. (incorporated by reference to Exhibit 10.30 included in our Annual Report on Form 10-K for the fiscal year ended December 31, 2018).**
10.24	Soligenix, Inc. 2015 Equity Incentive Plan, as amended on as amended on June 18, 2017 and September 27, 2018 and as proposed to be amended on September 6, 2019 (incorporated by reference to Exhibit 10.1 included in our current report on Form 8-K filed on September 11, 2019).
10.25	Employment Agreement dated as of September 6, 2019 between the Company and Jonathan L. Guarino (incorporated by reference to Exhibit 10.2 included in our current report on Form 8-K filed on September 11, 2019).**
10.26	Second Amendment to Employment Agreement dated as of January 2, 2020, between Soligenix, Inc. and Christopher J. Schaber, PhD (incorporated by reference to Exhibit 10.2 included in our current report on Form 8-K filed on January 3, 2020).**
21.1	Subsidiaries of the Company. *
23.1	Consent of EisnerAmper LLP. *
31.1	Certification of the Chief Executive Officer pursuant to Exchange Act rule 13(a)-14(a) (under Section 302 of the Sarbanes-Oxley Act of 2002). *
31.2	Certification of the Chief Financial Officer pursuant to Exchange Act rule 13(a)-14(a) (under Section 302 of the Sarbanes-Oxley Act of 2002). *
32.1	Certification of the Chief Executive Officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002. *
32.2	Certification of the Chief Financial Officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002. *
101.INS	XBRL Instance Document
101.SCH	XBRL Taxonomy Extension Schema Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	XBRL Taxonomy Extension Label Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document

* Filed herewith.

** Indicates management contract or compensatory plan.

† Portions of this exhibit have been omitted pursuant to a request for confidential treatment.

SIGNATURES

In accordance with Section 13 or 15(d) of the Exchange Act, the registrant caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

SOLIGENIX, INC.

By: /s/ Christopher J. Schaber
Christopher J. Schaber, PhD
Chief Executive Officer and President

Date: March 30, 2020

In accordance with the Exchange Act, this report has been signed below by the following persons on behalf of the registrant and in the capacities indicated and on the dates indicated.

<u>Name</u>	<u>Capacity</u>	<u>Date</u>
<u>/s/ Christopher J. Schaber</u> Christopher J. Schaber, PhD	Chairman of the Board, Chief Executive Officer and President (principal executive officer)	March 30, 2020
<u>/s/ Gregg A. Lapointe</u> Gregg A. Lapointe, CPA	Director	March 30, 2020
<u>/s/ Diane L. Parks</u> Diane L. Parks, MBA	Director	March 30, 2020
<u>/s/ Mark Pearson</u> Mark Pearson	Director	March 30, 2020
<u>/s/ Robert J. Rubin</u> Robert J. Rubin, MD	Director	March 30, 2020
<u>/s/ Jerome B. Zeldis</u> Jerome B. Zeldis, MD, PhD	Director	March 30, 2020
<u>/s/ Jonathan Guarino</u> Jonathan Guarino, CPA, CGMA	Chief Financial Officer, Senior Vice President, and Corporate Secretary (principal accounting officer)	March 30, 2020

SOLIGENIX, INC. AND SUBSIDIARIES
CONSOLIDATED FINANCIAL STATEMENTS

Table of Contents

	Page
<u>Consolidated Balance Sheets as of December 31, 2019 and 2018</u>	F-2
<u>Consolidated Statements of Operations for the Years Ended December 31, 2019 and 2018</u>	F-3
<u>Consolidated Statements of Comprehensive Loss for the Years Ended December 31, 2019 and 2018</u>	F-4
<u>Consolidated Statements of Changes in Shareholders' Equity for the Years Ended December 31, 2019 and 2018</u>	F-5
<u>Consolidated Statements of Cash Flows for the Years Ended December 31, 2019 and 2018</u>	F-6
<u>Notes to Consolidated Financial Statements</u>	F-7 - F-22
<u>Report of Independent Registered Public Accounting Firm</u>	F-23

Soligenix, Inc. and Subsidiaries
Consolidated Balance Sheets
As of December 31, 2019 and 2018

	2019	2018
Assets		
Current assets:		
Cash and cash equivalents	\$ 5,420,708	\$ 8,983,717
Contracts and grants receivable	1,018,835	1,201,715
UK research and development incentives receivable	444,043	-
Prepaid expenses and other current assets	609,739	157,278
Total current assets	7,493,325	10,342,710
Security deposit	22,757	22,734
Office furniture and equipment, net	36,093	19,634
Deferred issuance costs	39,324	59,761
Intangible assets, net	19,699	46,863
Right-of-use lease assets	125,412	-
Other assets	38,750	-
Total assets	\$ 7,775,360	\$ 10,491,702
Liabilities and shareholders' equity		
Current liabilities:		
Accounts payable	\$ 2,735,442	\$ 2,126,215
Accrued expenses	3,157,386	1,790,689
Accrued compensation	298,173	294,628
Lease liabilities - current	121,075	-
Total current liabilities	6,312,076	4,211,532
Non-current liabilities:		
Lease liabilities, net of current	6,149	-
Total liabilities	6,318,225	4,211,532
Commitments and contingencies		
Shareholders' equity:		
Preferred stock: 350,000 shares authorized; none issued or outstanding	-	-
Common stock, \$.001 par value; 50,000,000 shares authorized; 21,753,124 and 17,682,839 shares issued and outstanding at December 31, 2019 and 2018, respectively	21,753	17,683
Additional paid-in capital	177,006,004	172,436,176
Accumulated other comprehensive loss	(45,010)	(3,669)
Accumulated deficit	(175,525,612)	(166,170,020)
Total shareholders' equity	1,457,135	6,280,170
Total liabilities and shareholders' equity	\$ 7,775,360	\$ 10,491,702

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

Soligenix, Inc. and Subsidiaries
Consolidated Statements of Operations
For the Years Ended December 31,

	<u>2019</u>	<u>2018</u>
Revenues:		
Contract revenue	\$ 3,215,639	\$ 3,965,496
Grant revenue	1,414,277	1,275,952
Total revenues	<u>4,629,916</u>	<u>5,241,448</u>
Cost of revenues	<u>(3,567,415)</u>	<u>(4,597,715)</u>
Gross profit	<u>1,062,501</u>	<u>643,733</u>
Operating expenses:		
Research and development	8,122,610	6,750,954
General and administrative	3,480,912	2,951,760
Total operating expenses	<u>11,603,522</u>	<u>9,702,714</u>
Loss from operations	<u>(10,541,021)</u>	<u>(9,058,981)</u>
Other income:		
Foreign currency transaction (loss)/gain	(7,809)	437
Interest income	148,968	158,569
UK research and development incentives	433,594	-
Net loss before income taxes	<u>(9,966,268)</u>	<u>(8,899,975)</u>
Income tax benefit	610,676	-
Net loss	<u>\$ (9,355,592)</u>	<u>\$ (8,899,975)</u>
Basic and diluted net loss per share	<u>\$ (0.48)</u>	<u>\$ (0.68)</u>
Basic and diluted weighted average common shares outstanding	<u>19,376,508</u>	<u>13,178,154</u>

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

Soligenix, Inc. and Subsidiaries
Consolidated Statements of Comprehensive Loss
For the Years Ended December 31, 2019 and 2018

	<u>2019</u>	<u>2018</u>
Net loss	\$ (9,355,592)	\$ (8,899,975)
Other comprehensive loss:		
Foreign currency translation adjustments	<u>(41,341)</u>	<u>(3,669)</u>
Comprehensive loss	<u>\$ (9,396,933)</u>	<u>\$ (8,903,644)</u>

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

Soligenix, Inc. and Subsidiaries
Consolidated Statements of Changes in Shareholders' Equity
For the Years Ended December 31, 2019 and 2018

	<u>Common Stock</u>		<u>Additional Paid-In Capital</u>	<u>Accumulated Other Comprehensive Loss</u>	<u>Accumulated Deficit</u>	<u>Total</u>
	<u>Shares</u>	<u>Par Value</u>				
Balance, December 31, 2017	8,730,640	\$ 8,731	\$ 163,581,026	\$ -	\$ (157,270,045)	\$ 6,319,712
Issuance of common stock pursuant to Lincoln Park Equity Line	20,161	20	38,380	-	-	38,400
Issuance of common stock in public offering	8,932,038	8,932	8,628,014	-	-	8,636,946
Costs associated with public offering	-	-	(192,130)	-	-	(192,130)
Share-based compensation expense	-	-	380,886	-	-	380,886
Foreign currency translation adjustment	-	-	-	(3,669)	-	(3,669)
Net loss	-	-	-	-	(8,899,975)	(8,899,975)
Balance, December 31, 2018	17,682,839	\$ 17,683	\$ 172,436,176	\$ (3,669)	\$ (166,170,020)	\$ 6,280,170
Issuance of common stock pursuant to FBR At-the-Market Sales Agreement	3,824,585	3,824	4,138,632	-	-	4,142,456
Cost associated with issuance of common stock	-	-	(152,517)	-	-	(152,517)
Issuance of common stock to vendors	245,700	246	205,492	-	-	205,738
Exercise of common stock options	-	-	1,882	-	-	1,882
Share-based compensation expense	-	-	376,339	-	-	376,339
Foreign currency translation adjustment	-	-	-	(41,341)	-	(41,341)
Net loss	-	-	-	-	(9,355,592)	(9,355,592)
Balance, December 31, 2019	21,753,124	\$ 21,753	\$ 177,006,004	\$ (45,010)	\$ (175,525,612)	\$ 1,457,135

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

Soligenix, Inc. and Subsidiaries
Consolidated Statements of Cash Flows
For the Years Ended December 31,

	<u>2019</u>	<u>2018</u>
Operating activities:		
Net loss	\$ (9,355,592)	\$ (8,899,975)
Adjustments to reconcile net loss to net cash used in operating activities:		
Amortization and depreciation	54,450	44,060
Noncash lease expense	123,110	-
Share-based compensation	376,339	380,886
Issuance of common stock for services	159,238	-
(Gain) loss on disposition of office furniture	(3,843)	1,483
Change in operating assets and liabilities:		
Contracts and grants receivable	182,880	(275,464)
Prepaid expenses and other current assets	(452,255)	105,976
Security deposit	(23)	-
UK research and development incentives receivable	(444,043)	-
Tax receivable	-	416,810
Operating lease liability	(121,938)	-
Accounts payable and accrued expenses	1,968,565	1,019,984
Accrued compensation	3,545	(38,391)
Total adjustments	<u>1,846,025</u>	<u>1,655,344</u>
Net cash used in operating activities	<u>(7,509,567)</u>	<u>(7,244,631)</u>
Investing activities:		
Purchases of office furniture and equipment	(30,209)	(1,925)
Proceeds from sale of office furniture	5,500	1,000
Net cash used in investing activities	<u>(24,709)</u>	<u>(925)</u>
Financing activities:		
Proceeds from issuance of common stock and warrants pursuant to public and private offerings	-	8,636,946
Stock issuance costs associated with public and private offerings	-	(251,891)
Proceeds from issuance of common stock pursuant to FBR At-the-Market Sales Agreement	4,142,456	-
Costs associated with issuance of common stock	(132,080)	-
Proceeds from issuance of common stock pursuant to the equity line	-	38,400
Proceeds from the exercises of stock options	1,882	-
Principal repayment – financing lease	(6,803)	-
Net cash provided by financing activities	<u>4,005,455</u>	<u>8,423,455</u>
Effect of exchange rate on cash and cash equivalents	(34,188)	(3,669)
Net (decrease) increase in cash and cash equivalents	<u>(3,563,009)</u>	<u>1,174,230</u>
Cash and cash equivalents at beginning of year	8,983,717	7,809,487
Cash and cash equivalents at end of year	<u>\$ 5,420,708</u>	<u>\$ 8,983,717</u>
Supplemental information:		
Cash paid for state income taxes	\$ 11,132	\$ 2,580
Cash paid for lease liabilities:		
Operating lease:	140,017	-
Financing lease:	8,544	-
Non-cash investing and financing activities:		
Right-of use assets and lease liabilities recognized on January 1, 2019	255,965	-
Deferred issuance cost reclassified to additional-paid-in capital	33,535	-
Issuance of restricted common stock to vendor for website development costs	46,500	-
Issuance of common stock to vendor included in prepaid expenses	2,550	-

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

Soligenix, Inc. and Subsidiaries
Notes to Consolidated Financial Statements

Note 1. Nature of Business

Basis of Presentation

Soligenix, Inc. (the “Company”) is a late-stage biopharmaceutical company focused on developing and commercializing products to treat rare diseases where there is an unmet medical need. The Company maintains two active business segments: Specialized BioTherapeutics (formerly “BioTherapeutics”) and Public Health Solutions (formerly “Vaccines/BioDefense”).

The Company’s Specialized BioTherapeutics business segment is developing a novel photodynamic therapy (SGX301) utilizing topical synthetic hypericin activated with safe visible fluorescent light for the treatment of cutaneous T-cell lymphoma (“CTCL”), its first-in-class innate defense regulator (“IDR”) technology, dusquetide (SGX942) for the treatment of oral mucositis in head and neck cancer, and proprietary formulations of oral beclomethasone 17,21-dipropionate (“BDP”) for the prevention/treatment of gastrointestinal (“GI”) disorders characterized by severe inflammation, including pediatric Crohn’s disease (SGX203) and acute radiation enteritis (SGX201).

The Company’s Public Health Solutions business segment includes active development programs for RiVax[®], its ricin toxin vaccine candidate and SGX943, a therapeutic candidate for antibiotic resistant and emerging infectious disease. The development of the vaccine program is currently supported by the heat stabilization technology, known as ThermoVax[®], under existing and on-going government contract funding. With the government contract from the National Institute of Allergy and Infectious Diseases (“NIAID”), the Company will attempt to advance the development of RiVax[®] to protect against exposure to ricin toxin.

The Company generates revenues under government grants primarily from the National Institutes of Health (“NIH”) and government contracts from NIAID. The Company is currently developing RiVax[®] under a NIAID contract of up to \$24.7 million over six years, and SGX301 and SGX942 under two separate NIH grants of approximately \$1.5 million each over two years, and a one-year NIH grant of \$150,000 in support of its SGX942 pediatric program. In addition, the Company has a subcontract of approximately \$700,000 from a NIAID grant over five years for its thermostabilization technology, and a Defense Threat Reduction Agency subcontract of approximately \$600,000 over three years for SGX943. The Company will continue to apply for additional government funding.

The Company is subject to risks common to companies in the biotechnology industry including, but not limited to, development of new technological innovations, dependence on key personnel, protections of proprietary technology, compliance with the United States (“U.S.”) Food and Drug Administration (the “FDA”) regulations, and other regulatory authorities, litigation, and product liability.

Liquidity

In accordance with Accounting Standards Codification 205-40, Going Concern, the Company has evaluated whether there are conditions and events, considered in the aggregate, that raise substantial doubt about the Company’s ability to continue as a going concern within one year after the date the consolidated financial statements are issued. As of December 31, 2019, the Company had an accumulated deficit of \$175,525,612. During the year ended December 31, 2019, the Company incurred a net loss of \$9,355,592 and used \$7,509,567 of cash in operations. The Company expects to continue to generate losses in the foreseeable future. The Company’s liquidity needs will be largely determined by the budgeted operational expenditures incurred in regards to the progression of its product candidates. The Company’s plans to meet its liquidity needs primarily include its ability to control the timing and spending on its research and development programs and raising additional funds through potential partnerships and/or financings. From January 1, 2020 through March 23, 2020, the Company sold 1,732,115 shares of common stock pursuant to the FBR Sales Agreement at a weighted average price of \$2.30 per share. Based on the Company’s approved operating budget, current rate of cash outflows, cash on hand, proceeds from government contract and grant programs, and proceeds available from the At Market Issuance Sales Agreement (“FBR Sales Agreement”) with B. Riley FBR, Inc. (“FBR”), management believes that its current cash will be sufficient to meet the anticipated cash needs for working capital and capital expenditures for at least the next 12 months from issuance of the financial statements.

As of December 31, 2019, the Company had cash and cash equivalents of \$5,420,708 as compared to \$8,983,717 as of December 31, 2018, representing a decrease of \$3,563,009 or 40%. As of December 31, 2019, the Company had working capital of \$1,181,249, as compared to working capital of \$6,131,178 for the prior year, representing a decrease of \$4,949,929. The decrease in cash and cash equivalents was primarily the result of the use of cash to fund operations partially offset by the proceeds raised by the Company's financing activities. The decrease in working capital was primarily related to the expenditures incurred in the expansion of the pivotal Phase 3 trial of SGX942 in addition to the ongoing expenditures incurred in the pivotal Phase 3 clinical trial of SGX301.

Management's business strategy can be outlined as follows:

- Following positive primary endpoint topline analysis for the Phase 3 clinical trial of SGX301, continue to explore partnership and commercialization while pursuing New Drug Application filing;
- Following positive interim analysis, complete enrolment and report final results in the Company's pivotal Phase 3 clinical trial of SGX942 for the treatment of oral mucositis in head and neck cancer;
- Continue development of RiVax[®] in combination with the Company's ThermoVax[®] technology to develop a new heat stable vaccine in biodefense with NIAID funding support;
- Continue to apply for and secure additional government funding for each of the Company's Specialized BioTherapeutics and Public Health Solutions programs through grants, contracts and/or procurements;
- Pursue business development opportunities for the Company's pipeline programs, as well as explore merger/acquisition strategies; and
- Acquire or in-license new clinical-stage compounds for development.

The Company's plans with respect to its liquidity management include, but are not limited to, the following:

- The Company has up to \$2.97 million in active government contract and grant funding still available as of December 31, 2019 to support its associated research programs through 2020 and beyond, provided the federal agencies exercise all options and do not elect to terminate the contracts or grants for convenience. The Company plans to submit additional contract and grant applications for further support of its programs with various funding agencies;
- The Company has continued to use equity instruments to provide a portion of the compensation due to vendors and collaboration partners and expects to continue to do so for the foreseeable future;
- The Company will continue to pursue Net Operating Loss ("NOL") sales in the state of New Jersey pursuant to its Technology Business Tax Certificate Transfer Program if available;
- The Company plans to pursue potential partnerships for pipeline programs. However, there can be no assurances that we can consummate such transactions;
- The Company has up to \$0.9 million remaining from the FBR Sales Agreement as of March 23, 2020 under the prospectus supplement updated October 3, 2018; and
- The Company may seek additional capital in the private and/or public equity markets, to continue its operations, respond to competitive pressures, develop new products and services, and to support new strategic partnerships. The Company is evaluating additional equity/debt financing opportunities on an ongoing basis and may execute them when appropriate. However, there can be no assurances that the Company can consummate such a transaction, or consummate a transaction at favorable pricing.

Note 2. Summary of Significant Accounting Policies

Principles of Consolidation

The consolidated financial statements include Soligenix, Inc., and its wholly and majority owned subsidiaries. All significant intercompany accounts and transactions have been eliminated as a result of consolidation.

Operating Segments

Operating segments are defined as components of an enterprise about which separate financial information is available that is evaluated on a regular basis by the chief operating decision maker, or decision making group, in deciding how to allocate resources to an individual segment and in assessing the performance of the segment. The Company divides its operations into two operating segments: Specialized BioTherapeutics and Public Health Solutions.

Cash and Cash Equivalents

The Company considers all highly liquid investments with maturities of three months or less when purchased to be cash equivalents.

Contracts and Grants Receivable

Contracts and grants receivable consist of amounts due from various grants from the NIH and contracts from NIAID, an institute of NIH, for costs incurred prior to the period end under reimbursement contracts. The amounts were billed to the respective governmental agencies in the month subsequent to period end and collected shortly thereafter. Accordingly, no allowance for doubtful amounts has been established. If amounts become uncollectible, they are charged to operations.

Intangible Assets

One of the most significant estimates or judgments that the Company makes is whether to capitalize or expense patent and license costs. The Company makes this judgment based on whether the technology has alternative future uses, as defined in Financial Accounting Standards Board ("FASB") Accounting Standards Codification ("ASC") 730, *Research and Development*. Based on this consideration, the Company capitalizes payments made to legal firms that are engaged in filing and protecting rights to intellectual property and rights for its current products in both the domestic and international markets. The Company believes that patent rights are one of its most valuable assets. Patents and patent applications are a key component of intellectual property, especially in the early stage of product development, as their purchase and maintenance gives the Company access to key product development rights from Soligenix's academic and industry partners. These rights can also be sold or sub-licensed as part of its strategy to partner its products at each stage of development as the intangible assets have alternative future use. The legal costs incurred for these patents consist of work associated with filing new patents designed to protect, preserve and maintain the Company's rights, and perhaps extend the lives of the patents. The Company capitalizes such costs and amortizes intangibles on a straight-line basis over their expected useful life – generally a period of 11 to 16 years.

The Company did not capitalize any patent related costs during the years ended December 31, 2019 or 2018.

Website Development Costs

In February 2019, Altamont Pharmaceutical Holdings, LLC ("Altamont"), a company which owns 5% or more of the Company's shares of common stock, signed a service agreement with a third-party vendor to re-develop the Company's website. Upon completion of the project at the end of June 2019, the Company capitalized the related website development costs of \$46,500 in accordance with FASB Codification ASC 350-50 "Accounting for Web Site Development Costs", which was reported in other assets in the consolidated balance sheet as of December 31, 2019. Beginning in the quarter ending September 30, 2019, the Company is amortizing the website development costs on a straight-line basis over three years, the estimated useful life of the website. The Company will also review its capitalized website development costs periodically for impairment. Website amortization expense for 2019 was \$7,750 and accumulated amortization was \$7,750 as of December 31, 2019.

Impairment of Long-Lived Assets

Office furniture and equipment, website development costs and intangible assets with finite lives are evaluated and reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. The Company recognizes impairment of long-lived assets in the event the net book value of such assets exceeds the estimated future undiscounted cash flows attributable to such assets. If the sum of the expected undiscounted cash flows is less than the carrying value of the related asset or group of assets, a loss is recognized for the difference between the fair value and the carrying value of the related asset or group of assets. Such analyses necessarily involve significant judgment.

The Company did not record any impairment of long-lived assets for the years ended December 31, 2019 or 2018.

Fair Value of Financial Instruments

FASB ASC 820 — *Fair Value Measurements and Disclosures*, defines fair value as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. FASB ASC 820 requires disclosures about the fair value of all financial instruments, whether or not recognized, for financial statement purposes. Disclosures about the fair value of financial instruments are based on pertinent information available to the Company on December 31, 2019. Accordingly, the estimates presented in these financial statements are not necessarily indicative of the amounts that could be realized on disposition of the financial instruments.

FASB ASC 820 specifies a hierarchy of valuation techniques based on whether the inputs to those valuation techniques are observable or unobservable. Observable inputs reflect market data obtained from independent sources, while unobservable inputs reflect market assumptions. The hierarchy gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 measurement) and the lowest priority to unobservable inputs (Level 3 measurement).

The three levels of the fair value hierarchy are as follows:

- Level 1 — Quoted prices in active markets for identical assets or liabilities that the reporting entity has the ability to access at the measurement date. Level 1 primarily consists of financial instruments whose value is based on quoted market prices such as exchange-traded instruments and listed equities.
- Level 2 — Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly or indirectly. Level 2 includes financial instruments that are valued using models or other valuation methodologies. These models consider various assumptions, including volatility factors, current market prices and contractual prices for the underlying financial instruments. Substantially all of these assumptions are observable in the marketplace, can be derived from observable data or are supported by observable levels at which transactions are executed in the marketplace.
- Level 3 — Unobservable inputs for the asset or liability. Financial instruments are considered Level 3 when their fair values are determined using pricing models, discounted cash flows or similar techniques and at least one significant model assumption or input is unobservable.

The carrying amounts reported in the consolidated balance sheets for cash and cash equivalents, contracts and grants receivable, tax receivable, accounts payable, accrued expenses, and accrued compensation approximate their fair value based on the short-term maturity of these instruments.

Revenue Recognition

The Company's revenues are primarily generated from government contracts and grants. The revenue from government contracts and grants is based upon subcontractor costs and internal costs incurred that are specifically covered by the contracts and grants, plus a facilities and administrative rate that provides funding for overhead expenses and management fees. These revenues are recognized when expenses have been incurred by subcontractors or when the Company incurs reimbursable internal expenses that are related to the government contracts and grants.

Research and Development Costs

Research and development costs are charged to expense when incurred in accordance with FASB ASC 730, *Research and Development*. Research and development includes costs such as clinical trial expenses, contracted research and license agreement fees with no alternative future use, supplies and materials, salaries, share-based compensation, employee benefits, equipment depreciation and allocation of various corporate costs. Purchased in-process research and development expense represents the value assigned or paid for acquired research and development for which there is no alternative future use as of the date of acquisition.

Share-Based Compensation

Stock options are issued with an exercise price equal to the market price on the date of grant. Stock options issued to directors upon re-election vest quarterly for a period of one year (new director issuances are fully vested upon issuance). Stock options issued to employees generally vest 25% on the grant date, then 25% each subsequent year for a period of three years. These options have a ten year life for as long as the individuals remain employees or directors. In general, when an employee or director terminates their position, the options will expire within three months, unless otherwise extended by the Board.

From time to time, the Company issues restricted shares of common stock to vendors and consultants as compensation for services performed under the Company's 2015 Equity Incentive Plan (the "2015 Plan"). The 2015 Plan provides for the grant of stock options, restricted stock, deferred stock and unrestricted stock to our employees and non-employees (including consultants). The shares issued under the 2015 Plan are registered on Form S-8 (SEC File No. 333-208515). However, as shares of common stock are not covered by a reoffer prospectus, the certificates reflecting such shares reflect a Securities Act of 1933, as amended restrictive legend. In June 2018, the FASB amended the accounting for share-based compensation issued to nonemployees in ASU 2018-07. Under the revised guidance, the scope of FASB ASC 718 was expanded to include share-based payments issued to nonemployees, supersedes FASB ASC 505-50 and generally aligns the accounting for awards issued to nonemployees to the accounting for employee awards. The Company adopted the new guidance effective January 1, 2019, and in accordance with the new guidance, stock compensation expense for equity-classified awards to nonemployees is measured on the date of grant and is recognized when the services are performed. The adoption of ASU 2018-07 did not have a material impact on the Company's financial statements.

The fair value of options issued during the years ended December 31, 2019 and 2018 was estimated using the Black-Scholes option-pricing model and the following assumptions:

- a dividend yield of 0%;
- an expected life of 4 years;
- volatility of 83% - 93% for 2019 and 91% - 94% for 2018; and
- risk-free interest rates ranging from 1.44% to 2.50% in 2019 and 2.68% to 2.93% in 2018.

The fair value of each option grant made during 2019 and 2018 was estimated on the date of each grant using the Black-Scholes option pricing model and recognized as share-based compensation ratably over the option vesting periods, which approximates the service period.

Foreign Currency Transactions and Translation

In 2018, the Company changed the status of a wholly owned subsidiary in the United Kingdom ("UK") from inactive to active and incurred expenditures in multiple currencies including the U.S. dollar, the British Pound and the Euro to fund its clinical trial operations in the UK and select countries in Europe. In accordance with FASB ASC 830 *Foreign Currency Matters*, the UK subsidiary expresses its U.S. dollar and Euro denominated transactions in its functional currency, the British Pound, with related transaction gains or losses included in net loss. On a quarterly basis, the financial statements of the UK subsidiary are translated into U.S. dollars and consolidated into the Company's financials, with related translation adjustments reported as a cumulative translation adjustment ("CTA"), which is a component of accumulated other comprehensive loss. In 2019 and 2018, the Company recognized foreign currency transaction loss and gain of \$7,809 and \$437, respectively, in its consolidated statements of operations and a foreign currency translation loss of \$45,010 and \$3,669 as CTA in its consolidated balance sheets, respectively.

Income Taxes

Deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax basis. A valuation allowance is established when it is more likely than not that all or a portion of a deferred tax asset will not be realized. A review of all available positive and negative evidence is considered, including the Company's current and past performance, the market environment in which the Company operates, the utilization of past tax credits, and the length of carryback and carryforward periods. Deferred tax assets and liabilities are measured utilizing tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. No current or deferred income taxes have been provided through December 31, 2019 due to the net operating losses incurred by the Company since its inception. The Company recognizes accrued interest and penalties associated with uncertain tax positions, if any, as part of income tax expense. There were no tax related interest and penalties recorded for 2019 and 2018. Additionally, the Company has not recorded an asset for unrecognized tax benefits or a liability for uncertain tax positions at December 31, 2019 and 2018.

Research and Development Incentive Income and Receivable

The Company recognizes other income from United Kingdom research and development incentives when there is reasonable assurance that the income will be received, the relevant expenditure has been incurred, and the consideration can be reliably measured. The small or medium sized enterprise ("SME") research and development tax relief program supports companies that seek to research and develop an advance in their field and is governed through legislative law by HM Revenue & Customs as long as specific eligibility criteria are met.

Management has assessed the Company's research and development activities and expenditures to determine which activities and expenditures are likely to be eligible under the SME research and development tax relief program described above. At each period end management estimates the refundable tax offset available to the Company based on available information at the time. As the tax incentives may be received without regard to an entity's actual tax liability, they are not subject to accounting for income taxes. As a result, amounts realized under the SME R&D tax relief scheme are recorded as a component of other income.

The research and development incentive receivable represents an amount due in connection with the above program. The Company has recorded a research and development incentive receivable of approximately \$444,000 as of December 31, 2019 in the consolidated balance sheet and approximately \$434,000 in other income in the consolidated statement of operations for the year then ended related to the SME research and development tax relief program.

Earnings Per Share

Basic earnings per share ("EPS") excludes dilution and is computed by dividing income (loss) available to common stockholders by the weighted-average number of common shares outstanding for the period. Diluted EPS reflects the potential dilution that could occur if securities or other contracts to issue common stock were exercised or converted into common stock or resulted in the issuance of common stock that shared in the earnings of the entity. Since there is a significant number of options and warrants outstanding, fluctuations in the actual market price can have a variety of results for each period presented.

The following table summarizes potentially dilutive adjustments to the number of common shares which were excluded from the diluted calculation because their effect would be anti-dilutive due to the losses in each period.

	For the Year Ended December 31, 2019	For the Year Ended December 31, 2018
Common stock purchase warrants	6,192,711	6,303,643
Stock options	1,506,972	1,022,095
Total	7,699,683	7,325,738

The weighted average exercise price of the Company's stock options and warrants outstanding at December 31, 2019 were \$3.77 and \$2.88 per share, respectively.

Use of Estimates and Assumptions

The preparation of financial statements in conformity with accounting principles generally accepted in the U.S. requires management to make estimates and assumptions such as the fair value of warrants and stock options and the useful life of intangibles that affect the reported amounts in the financial statements and accompanying notes. Actual results could differ from those estimates.

Accounting for Leases

On January 1, 2019, the Company adopted FASB ASU No. 2016-02, "Leases" (Topic 842) (the "Lease Standard"), a new standard which requires all leases with terms longer than 12 months be recognized by the lessee on its balance sheet as a right-of-use lease asset and a corresponding lease liability, including leases currently accounted for as operating leases, and key information about leasing arrangements to be disclosed.

The Company adopted the Lease Standard under the alternative transition method permitted by ASU 2018-11. This transition method allowed the Company to initially apply the requirements of the Lease Standard at the adoption date, versus at the beginning of the earliest period presented. The Company elected the transition package of practical expedients, which permits not separating lease and non-lease components for all of its leases and the short-term lease recognition exemption for all of its leases that qualify; however, it did not elect the use of hindsight practical expedient.

As a result of the adoption of the Lease Standard, the Company classified a lease for its office space at 29 Emmons Drive, Suite B-10 in Princeton, New Jersey and a lease for a copier machine in the office as an operating lease and a financing lease, respectively, and recorded related right-of-use lease assets and lease liabilities accordingly. As of December 31, 2019, the Company's consolidated balance sheet included a right-of-use lease asset of \$112,387 for the office space and \$13,025 for the copier machine. Lease liabilities in the Company's consolidated balance sheet included corresponding lease liabilities of \$113,559 and \$13,665, respectively. During the year ended December 31, 2019, the Company recognized lease expense of \$141,191 for the operating lease, in addition to amortization expense of \$7,443 and interest expense of \$1,741 for the financing lease in the Company's consolidated statement of operations.

The following represent a reconciliation of contractual lease cash flows to the right-of-use lease assets and liabilities recognized in the financial statements upon adoption:

	<u>Operating Lease</u>	<u>Financing Lease</u>
Contractual cash payments for the remaining lease term as of January 1, 2019:		
2019	\$ 140,016	\$ 8,544
2020	118,830	8,544
2021	-	6,408
Total	\$ 258,846	\$ 23,496
Discount rate applied	10%	10%
Present value of contractual cash payments for the remaining lease term as of January 1, 2019	\$ 235,497	\$ 20,468
Right-of-use lease asset:		
Right-of-use lease asset, January 1, 2019	\$ 235,497	\$ 20,468
Less: reduction/amortization	123,110	7,443
Right-of-use lease asset, December 31, 2019	\$ 112,387	\$ 13,025
Lease liability:		
Lease liability, January 1, 2019	\$ 235,497	\$ 20,468
Less: repayments	121,938	6,803
Lease liability, December 31, 2019	\$ 113,559	\$ 13,665
Lease expenses for the year ending December 31, 2019:		
Lease expense	\$ 141,191	\$ -
Amortization expense	-	7,443
Interest expense	-	1,741
Total	\$ 141,191	\$ 9,184
Contractual cash payments for the remaining lease term as of December 31, 2019:		
2020	\$ 118,833	\$ 8,544
2021	-	6,408
Total	\$ 118,833	\$ 14,952
Remaining lease term (months) as of December 31, 2019	10	21

The following disclosure as of December 31, 2018 continues to be in accordance with ASC 840. Future minimum lease payments for operating leases at December 31, 2018 was as follows:

Year	Total
2019	\$ 148,561
2020	127,377
2021	4,984
Total	\$ 280,922

Rent expense under ASC 840 for the year ended December 31, 2018 was \$145,449.

Note 3. Intangible Assets

The following is a summary of intangible assets which consists of licenses and patents:

	<u>Cost</u>	<u>Accumulated Amortization</u>	<u>Net Book Value</u>
December 31, 2019			
Licenses	\$ 462,234	\$ 442,535	\$ 19,699
Patents	1,893,185	1,893,185	-
Total	\$ 2,355,419	\$ 2,335,720	\$ 19,699
December 31, 2018			
Licenses	\$ 462,234	\$ 415,371	\$ 46,863
Patents	1,893,185	1,893,185	-
Total	\$ 2,355,419	\$ 2,308,556	\$ 46,863

Amortization expense was \$27,164 and \$27,089 in 2019 and 2018, respectively.

Based on the balance of licenses and patents at December 31, 2019, future annual amortization expense is expected to be \$19,699 during the year ending December 31, 2020.

License fees and royalty payments are expensed annually as incurred, as the Company does not attribute any future benefits of such payments.

Note 4. Accrued Expenses

The following is a summary of the Company's accrued expenses:

	As of December 31,	
	2019	2018
Clinical trial expenses	\$ 3,020,030	\$ 1,633,713
Other	137,356	156,976
Total	<u>\$ 3,157,386</u>	<u>\$ 1,790,689</u>

Note 5. Income Taxes

The income tax benefit consisted of the following for the years ended December 31, 2019 and 2018:

	2019	2018
Federal	\$ -	\$ -
Foreign	-	-
State	(610,676)	-
Income tax benefit	<u>\$ (610,676)</u>	<u>\$ -</u>

The significant components of the Company's deferred tax assets and liabilities at December 31, 2019 and 2018 are as follows:

	2019	2018
Net operating loss carry forwards	\$ 23,936,000	\$ 22,996,000
Orphan drug and research and development credit carry forwards	8,315,000	8,333,000
Equity based compensation	1,331,000	1,331,000
Intangibles	1,051,000	1,164,000
Total	<u>34,633,000</u>	<u>33,824,000</u>
Valuation allowance	<u>(34,633,000)</u>	<u>(33,824,000)</u>
Net deferred tax assets	<u>\$ -</u>	<u>\$ -</u>

The Company had gross NOLs at December 31, 2019 of approximately \$107,767,000 for federal tax purposes, approximately \$16,180,000 for state tax purposes and approximately \$815,000 for foreign tax purposes. Federal losses generated in 2018 or later will carry forward indefinitely. In addition, the Company has \$8,315,000 of various tax credits which expire from 2020 to 2037. The Company may be able to utilize its NOLs to reduce future federal and state income tax liabilities. However, these NOLs are subject to various limitations under Internal Revenue Code ("IRC") Section 382. IRC Section 382 limits the use of NOLs to the extent there has been an ownership change of more than 50 percentage points. In addition, the NOL carry forwards are subject to examination by the taxing authority and could be adjusted or disallowed due to such exams. Although the Company has not undergone an IRC Section 382 analysis, it is likely that the utilization of the NOLs may be substantially limited.

The Company and one or more of its subsidiaries files income tax returns in the U.S. Federal jurisdiction, and various state and local jurisdictions. During the year ended December 31, 2019, in accordance with the State of New Jersey's Technology Business Tax Certificate Program, which allowed certain high technology and biotechnology companies to sell unused NOL carry forwards to other New Jersey-based corporate taxpayers, the Company sold New Jersey NOL carry forwards, resulting in the recognition of \$610,676 of income tax benefit, net of transaction costs. The Company has not yet sold its 2018 or 2019 New Jersey NOLs but may be able to do so in the future. There can be no assurance as to the continuation or magnitude of this program in the future.

Reconciliations of the difference between income tax benefit computed at the federal and state statutory tax rates and the provision for income tax benefit for the years ended December 31, 2019 and 2018 were as follows:

	<u>2019</u>	<u>2018</u>
Federal tax at statutory rate	(21.0)%	(21.0)%
State tax benefits, plus sale of NJ NOL, net of federal benefit	(8.8)	(12.5)
Foreign tax rate difference	0.3	0.2
Orphan drug and research and development credits	1.8	1.1
Permanent differences	2.1	0.9
Foreign NOL adjustments	2.5	-
Expiration of tax attributes	8.8	8.4
Change in valuation allowance	8.3	22.9
Income tax benefit	<u>(6.0)%</u>	<u>-%</u>

Note 6. Shareholders' Equity

Preferred Stock

The Company has 350,000 shares of preferred stock authorized, none of which are issued or outstanding.

Common Stock

The following items represent transactions in the Company's common stock for the year ended December 31, 2019:

- On January 2, 2019, the Company issued 60,000 shares of common stock to a vendor as partial consideration for its service performed. The fair value of the shares was \$0.96 per share.
- The Company issued 8,681 shares of restricted common stock on both April 29, 2019 and July 1, 2019 to a vendor as consideration for its service performed. The fair values for the shares issued were \$0.73 and \$0.72 per share, respectively.
- On May 15, 2019, the Company issued 50,000 shares of common stock to a vendor as partial consideration for its service performed. The fair value of the shares was \$0.83 per share. In addition, the Company issued to the vendor 25,000 shares of common stock with a fair value of \$0.98 per share on July 15, 2019, 5,000 shares of common stock with a fair value of \$1.05 per share on August 15, 2019, and 10,000 shares with a fair value of \$0.88 per share on September 15, 2019.
- On June 28, 2019, the Company issued 78,338 shares of restricted common stock to Altamont, a company which owns 5% or more of the Company's shares of common stock, as reimbursement for its cost incurred related to the re-development of the Company's website and partial consideration for its service performed. The fair value of the shares was \$0.71 per share.
- During the quarter ended March 31, 2019, the Company issued 446,369 shares of common stock pursuant to the FBR Sales Agreement at a weighted average price of \$1.17 per share.
- During the quarter ended June 30, 2019, the Company issued 414,983 shares of common stock pursuant to the FBR Sales Agreement at a weighted average price of \$0.77 per share.
- During the quarter ended September 30, 2019, the Company issued 1,667,698 shares of common stock pursuant to the FBR Sales Agreement at a weighted average price of \$1.03 per share.
- During the quarter ended December 31, 2019, the Company issued 1,295,535 shares of common stock pursuant to the FBR Sales Agreement at a weighted average price of \$1.23 per share.

The following items represent transactions in the Company's common stock for the year ended December 31, 2018:

- On February 21, 2018, the Company issued 10,083 shares of common stock pursuant to the equity line with Lincoln Park Capital Fund, LLC ("Lincoln Park");
- On April 6, 2018, the Company issued 10,078 shares of common stock under the equity line with Lincoln Park;
- On July 2, 2018, the Company closed an underwritten public offering of 7,766,990 shares of its common stock and warrants to purchase 3,106,796 shares of common stock at a combined offering price of \$1.03;
- On July 9, 2018, the underwriter for the Company's underwritten public offering exercised the over-allotment option to purchase 1,165,048 additional shares of common stock and warrants to purchase 466,019 shares of common stock at a combined offering price of \$1.03.

All issuances of the Company's common stock for the years ended December 31, 2019 described above, other than shares issued under the FBR Sales Agreement, were issued under the 2015 Plan and are registered on a Registration Statement on Form S-8 (SEC File No. 333-208515). However, as shares of common stock are not covered by a reoffer prospectus, the certificates evidencing such shares reflect a Securities Act of 1933, as amended, restrictive legend.

Lincoln Park Equity Line

In March 2016, the Company entered into a common stock purchase agreement with Lincoln Park. The Lincoln Park equity facility allows the Company to require Lincoln Park to purchase up to 10,000 shares ("Regular Purchase") of the Company's common stock every two business days, up to an aggregate of \$12.0 million over approximately a 36-month period with such amounts increasing as the quoted stock price increases. In addition to the Regular Purchase and provided that the closing price of the common shares is not below \$7.50 on the purchase date, the Company in its sole discretion may direct Lincoln Park on each purchase date to purchase on the next stock trading day ("Accelerated Purchase Date") additional shares of Company stock up to the lesser of (i) three times the number of shares purchased following a Regular Purchase or (ii) 30% of the trading volume of shares traded on the Accelerated Purchase Date at a price equal to the lesser of the closing sale price on the Accelerated Purchase Date or 95% of the Accelerated Purchase Date's volume weighted average price. The common stock purchase agreement with Lincoln Park expired on March 31, 2019, and any issuable amounts of common stock remaining at the expiration date were forfeited.

FBR At Market Issuance Sales Agreement

On August 11, 2017, the Company entered into the FBR Sales Agreement to sell shares of the Company's common stock from time to time, through an "at-the-market" equity offering program under which FBR acts as sales agent. Under the FBR Sales Agreement, the Company sets the parameters for the sale of shares, including the number of shares to be issued, the time period during which sales may be requested to be made, limitation on the number of shares that may be sold in any one trading day and any minimum price below which sales may not be made. The FBR Sales Agreement provides that FBR is entitled to compensation for its services in an amount equal to 3% of the gross proceeds from the sale of shares sold under the FBR Sale Agreement. The Company has no obligation to sell any shares under the FBR Sales Agreement, and may suspend solicitation and offers under the FBR Sales Agreement at any time.

Sales of common stock made pursuant to the FBR Sales Agreement, if any, will be made pursuant to the Company's effective shelf registration statement on Form S-3 (File No. 333-217738) filed on May 5, 2017 with the SEC, the base prospectus filed as part of such registration statement, and any prospectus supplements. The shares sold pursuant to the FBR Sales Agreement have been and will be issued pursuant to General Instruction I.B.6 of Form S-3, which permits the Company to sell shelf securities in a public primary offering with a value not exceeding one-third of the average market value of the Company's voting and non-voting common equity held by non-affiliates in any 12-month period as long as the aggregate market value of the Company's outstanding voting and non-voting common equity held by non-affiliates is less than \$75 million.

On August 11, 2017, the Company filed a prospectus supplement for the sale of up to \$4.8 million of shares of common stock pursuant to the FBR Sales Agreement, and the Company sold an aggregate of approximately \$1 million of shares thereunder. On October 3, 2018, the Company filed an updated prospectus supplement with the SEC and may offer and sell shares of the Company's common stock pursuant to the FBR Sales Agreement having an aggregate offering price of up to \$9.0 million, from time to time. The prospectus supplement filed on October 3, 2018, supersedes the prospectus supplement dated August 11, 2017, and no additional shares will be offered or sold pursuant to the prospectus supplement dated August 11, 2017. As of March 23, 2020, there was \$0.9 million available for the sale of common stock under the FBR Sales Agreement.

Note 7. Related Party Transaction

In February 2019, Altamont, a company which owns 5% or more of the Company's shares of common stock, signed a service agreement with a third-party vendor to re-develop the Company's website. Upon completion of the project at the end of June 2019, the Company issued 78,338 shares of common stock of the Company, including 65,493 shares with a fair value of \$46,500 to Altamont as reimbursement for the website development costs incurred by Altamont on behalf of the Company. In accordance with FASB ASC 350-50 "Accounting for Web Site Development Cost", the Company has capitalized the value of these shares as website development costs of \$46,500, which was included in other assets with a carrying value of \$38,750, net of amortization, in the accompanying consolidated balance sheet as of December 31, 2019. The balance of 12,845 shares with a fair value of \$9,120 was issued to Altamont as consideration for its contractual investor relation and web hosting services, \$6,570 of which was expensed during the year ended December 31, 2019. The remaining balance of \$2,550 is included in prepaid expenses and other current assets as of December 31, 2019.

Note 8. Stock Option Plans and Warrants to Purchase Common Stock

Stock Option Plans

The Amended and Restated 2005 Equity Incentive Plan ("2005 Plan") was replaced by the 2015 Plan, which was approved in June 2015. No securities are available for future issuance under the 2005 Plan. As of December 31, 2019, approximately 663,700 shares are available for grants under the 2015 Plan, and are divided into four separate equity programs:

- 1) the Discretionary Option Grant Program, under which eligible persons may, at the discretion of the Plan Administrator, be granted options to purchase shares of common stock,
- 2) the Salary Investment Option Grant Program, under which eligible employees may elect to have a portion of their base salary invested each year in options to purchase shares of common stock,
- 3) the Automatic Option Grant Program, under which eligible nonemployee Board members will automatically receive options at periodic intervals to purchase shares of common stock, and
- 4) the Director Fee Option Grant Program, under which non-employee Board members may elect to have all, or any portion, of their annual retainer fee otherwise payable in cash applied to a special option grant.

Shares available for grant under the 2015 Plan were as follows:

Shares available for grant at January 1, 2019	153,149
Increase in shares available for grant	1,000,000
Options granted	(596,740)
Options forfeited	107,300
Shares available for grant at December 31, 2019	663,709

Activity under the 2005 Plan and the 2015 Plan for the years ended December 31, 2019 and 2018 was as follows:

	Options	Weighted Average Options Exercise Price
Balance outstanding at December 31, 2017	785,655	\$ 7.15
Granted	370,420	1.14
Forfeited	(133,980)	4.66
Balance outstanding at December 31, 2018	1,022,095	\$ 5.32
Granted	596,740	1.09
Forfeited	(111,863)	3.27
Balance outstanding at December 31, 2019	<u>1,506,972</u>	<u>\$ 3.77</u>

As of December 31, 2019, there were 908,178 options exercisable with a weighted average exercise price of \$5.49 and a weighted average remaining contractual term of 7.34 years. As of December 31, 2019, there were 1,506,972 options outstanding with a weighted average exercise price of \$3.77 and remaining term of 8.17 years.

The Company awarded 596,740 and 370,420 stock options during the years ended December 31, 2019 and 2018, respectively, which had a weighted average grant date fair value per share of \$0.68 and \$0.77, respectively. The weighted-average exercise price, by price range, for outstanding options to purchase common stock at December 31, 2019 was:

Price Range	Weighted Average Remaining Contractual Life in Years	Outstanding Options	Exercisable Options
\$0.71-\$17.20	8.46	1,431,154	832,360
\$20.00-\$39.80	3.76	50,830	50,830
\$41.00-\$48.00	0.66	24,988	24,988
Total	8.17	<u>1,506,972</u>	<u>908,178</u>

The Company's share-based compensation expense for the years ended December 31, 2019 and 2018 was recognized as follows:

Share-based compensation	2019	2018
Research and development	\$ 143,217	\$ 174,877
General and administrative	233,122	206,009
Total	<u>\$ 376,339</u>	<u>\$ 380,886</u>

At December 31, 2019, the total compensation cost for stock options not yet recognized was approximately \$493,000 and will be expensed over the next three years.

Warrants to Purchase Common Stock

On April 1, 2018, warrants to purchase 10,000 shares of the Company's common stock were issued to a third party consultant in Europe. The warrants are exercisable upon the achievement of specified performance milestones at a per share price of \$1.95 for a five-year period from issuance. As of December 31, 2019, warrants to purchase 10,000 shares of common stock were exercisable and compensation expense was recognized.

On July 2, 2018, the Company closed an underwritten public offering of 7,766,990 shares of its common stock and exercisable warrants to purchase up to an aggregate of 3,106,796 shares of its common stock at a combined offering price of \$1.03. In addition, at the closing the underwriters exercised the over-allotment option to purchase 1,165,048 additional shares of common stock and warrants to purchase up to 466,019 shares of common stock at a combined offering price of \$1.03. The warrants have a per share exercise price of \$2.25 and will expire 42 months from the date of issuance. On July 9, 2018, warrants to purchase 155,340 shares of the Company's common stock were issued to representatives of the underwriters of the offering. The warrants are exercisable at a per share price of \$1.13 and are exercisable twelve months from the effective date of the offering and will expire 42 months from the exercisable date. From January 1, 2020 through March 23, 2020, the Company issued 304,615 shares of common stock from the exercise of warrants issued in this public offering at an exercise price of \$2.25.

Warrant activity for the years ended December 31, 2019 and 2018 was as follows:

	Warrants	Weighted Average Exercise Price
Balance at December 31, 2017	2,577,238	\$ 4.38
Granted	3,738,155	2.20
Exercised	-	-
Expired	(11,750)	1.64
Balance at December 31, 2018	6,303,643	\$ 3.09
Granted	-	-
Exercised	-	-
Expired	(110,932)	14.80
Balance at December 31, 2019	6,192,711	\$ 2.88

The remaining life, by grant date, for outstanding warrants at December 31, 2019 was:

Grant Date	Exercise Price	Remaining Contractual Life in Years	Outstanding Warrants	Exercisable Warrants
12/16/2016	\$3.95	1.96	2,403,405	2,403,405
11/3/2017	\$2.50	2.83	51,151	51,151
4/1/2018	\$1.95	3.24	10,000	10,000
7/2/2018	\$2.25	2.01	3,572,815	3,572,815
7/9/2018	\$1.13	2.99	155,340	155,340
Total	\$2.88	2.02	6,192,711	6,192,711

Note 9. Concentrations

At December 31, 2019 and 2018, the Company had deposits in major financial institutions that exceeded the amount under protection by the Securities Investor Protection Corporation (“SIPC”). Currently, the Company is covered up to \$1,000,000 by the SIPC and at times maintains cash balances in excess of the SIPC coverage.

Note 10. Commitments and Contingencies

The Company has commitments of approximately \$400,000 at December 31, 2019 for several licensing agreements with consultants and universities. Additionally, the Company has collaboration and license agreements, which upon clinical or commercialization success, may require the payment of milestones of up to \$7.9 million and/or royalties up to 6% of net sales of covered products, if and when achieved. However, there can be no assurance that clinical or commercialization success will occur. In June 2018, the Company paid approximately \$197,000 in milestone payments.

The Company currently leases approximately 6,200 square feet of office space at 29 Emmons Drive, Suite B-10 in Princeton, New Jersey pursuant to a lease that was amended in October 2017 and expires in October 2020. This office space currently serves as the Company’s corporate headquarters. The rent for the first 12 months was approximately \$11,367 per month, or approximately \$22.00 per square foot. The rent increased to approximately \$11,625 per month, or approximately \$22.50 per square foot, for the 12 months beginning November 1, 2018 and increased beginning November 1, 2019 to approximately \$11,883 per month, or approximately \$23.00 per square foot, which rate will continue for the remainder of the lease.

On September 3, 2014, the Company entered into an asset purchase agreement with Hy Biopharma, Inc. (“Hy Biopharma”) pursuant to which the Company acquired certain intangible assets, properties and rights of Hy Biopharma related to the development of Hy BioPharma’s synthetic hypericin product. As consideration for the assets acquired, the Company paid \$275,000 in cash and issued 184,912 shares of common stock with a fair value based on the Company’s stock price on the date of grant of \$3,750,000. These amounts were charged to research and development expense during the third quarter of 2014 as the assets will be used in the Company’s research and development activities and do not have alternative future use pursuant to generally accepted accounting principles in the U.S. Provided all future success-oriented milestones are attained, the Company will be required to make additional payments of up to \$10.0 million, if and when achieved. Payments will be payable in restricted securities of the Company provided they do not exceed 19.9% ownership of the Company’s outstanding stock. As of December 31, 2019, no milestone or royalty payments have been paid or accrued. See Note 12. Subsequent Events.

In January 2020, the Company’s Board of Directors authorized the amendment of Dr. Schaber’s employment agreement to increase the number of shares of the Company’s common stock from 5,000 to 500,000 issuable to Dr. Schaber immediately prior to the completion of a transaction, or series or a combination of related transactions, negotiated by its Board of Directors whereby, directly or indirectly, a majority of its capital stock or a majority of its assets are transferred from the Company and/or its stockholders to a third party.

As a result of the above agreements, the Company has future contractual obligations over the next four years as follows:

Year	Research and Development	Property and Other Leases	Total
2020	\$ 100,000	\$ 127,377	\$ 227,377
2021	100,000	6,408	106,408
2022	100,000	-	100,000
2023	100,000	-	100,000
Total	\$ 400,000	\$ 133,785	\$ 533,785

Based on the current outbreak of the Coronavirus SARS-CoV-2, the pathogen responsible for COVID-19, which has already had an impact on financial markets, there could be additional repercussions to the Company’s operating business, including but not limited to, the sourcing of materials for product candidates, manufacture of supplies for preclinical and/or clinical studies, delays in clinical operations, which may include the availability or the continued availability of patients for trials due to such things as quarantines, conduct of patient monitoring and clinical trial data retrieval at investigational study sites.

The future impact of the outbreak is highly uncertain and cannot be predicted, and the Company cannot provide any assurance that the outbreak will not have a material adverse impact on the Company’s operations or future results or filings with regulatory health authorities. The extent of the impact to the Company, if any, will depend on future developments, including actions taken to contain the coronavirus.

Note 11. Operating Segments

The Company maintains two active operating segments: Specialized BioTherapeutics and Public Health Solutions. Each segment includes an element of overhead costs specifically associated with its operations, with its corporate shared services group responsible for support functions generic to both operating segments.

	For the Years Ended December 31,	
	2019	2018
Revenues		
Public Health Solutions	\$ 3,402,014	\$ 4,156,641
Specialized BioTherapeutics	1,227,902	1,084,807
Total	<u>\$ 4,629,916</u>	<u>\$ 5,241,448</u>
Income (Loss) from Operations		
Public Health Solutions	\$ 153,969	\$ (237,640)
Specialized BioTherapeutics	(6,738,284)	(5,439,294)
Corporate	(3,956,706)	(3,382,047)
Total	<u>\$ (10,541,021)</u>	<u>\$ (9,058,981)</u>
Amortization and Depreciation Expense		
Public Health Solutions	\$ 17,507	\$ 17,951
Specialized BioTherapeutics	18,122	21,018
Corporate	18,821	5,091
Total	<u>\$ 54,450</u>	<u>\$ 44,060</u>
Other Income, Net		
Specialized BioTherapeutics	\$ 425,785	-
Corporate	148,968	159,006
Total	<u>\$ 574,753</u>	<u>\$ 159,006</u>
Share-Based Compensation		
Public Health Solutions	\$ 36,003	\$ 57,307
Specialized BioTherapeutics	107,214	117,570
Corporate	233,122	206,009
Total	<u>\$ 376,339</u>	<u>\$ 380,886</u>
Identifiable Assets		
Public Health Solutions	\$ 1,018,673	\$ 1,181,114
Specialized BioTherapeutics	41,705	78,336
Corporate	6,714,983	9,232,252
Total	<u>\$ 7,775,360</u>	<u>\$ 10,491,702</u>

Note 12. Subsequent Events

Sales Pursuant to our FBR At Market Issuance Sales Agreement

From January 1, 2020 through March 23, 2020, the Company issued 1,732,115 shares of common stock pursuant to the FBR Sales Agreement at a weighted average price of \$2.30 per share.

Exercise of Warrants from the July 2, 2018 Public Offering

From January 1, 2020 through March 23, 2020, the Company issued 304,615 shares of common stock from the exercise of warrants issued in the July 2, 2018 public offering at an exercise price of \$2.25.

Hy Biopharma Milestone Payment

On September 3, 2014, the Company entered into an Asset Purchase Agreement (“APA”) with Hy Biopharma, pursuant to which the Company acquired certain tangible and intangible assets, properties and rights of Hy Biopharma related to the development of Hy Biopharma’s synthetic hypericin product, which the Company refers to as SGX301. Pursuant to the APA, the Company is required to issue Hy Biopharma shares of common stock upon the achievement of certain milestones, including if the Company’s Phase 3 clinical trial of SGX301 is successful in demonstrating efficacy and safety in the CTCL patient population.

On March 17, 2020, the Company determined the Phase 3 clinical trial of SGX301 to be successful in the treatment of CTCL. Accordingly, the Company issued 1,956,182 shares of common stock to Hy Biopharma as payment for achieving such milestone under the APA. The number of shares of common stock issued to Hy Biopharma was calculated using an effective price of \$2.56 per share, based upon a formula set forth in the APA.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To The Board of Directors and Stockholders of
Soligenix, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Soligenix, Inc. and Subsidiaries (the "Company") as of December 31, 2019 and 2018, and the related consolidated statements of operations, comprehensive loss, shareholders' equity, and cash flows for each of the years then ended and the related notes (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the consolidated financial position of the Company as of December 31, 2019 and 2018, and the consolidated results of their operations and their cash flows for each of the years then ended, in conformity with accounting principles generally accepted in the United States of America.

Adoption of New Accounting Standard

As discussed in Note 2 to the consolidated financial statements, the Company changed its method for accounting for leases in 2019.

Basis for Opinion

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

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

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

/s/ EisnerAmper LLP

We have served as the Company's auditor since 2010.

EISNERAMPER LLP
Iselin, New Jersey
March 30, 2020

SOLIGENIX, INC.
DESCRIPTION OF SECURITIES

The following description of the terms of our securities is not complete and is qualified in its entirety by reference to our Certificate of Incorporation, as amended (the "Certificate of Incorporation"), and our Bylaws, as amended (the "Bylaws"), both of which are filed as exhibits to our Annual Reports on Form 10-K and Quarterly Reports on Form 10-Q.

Under our Certificate of Incorporation and Bylaws, we are authorized capital to issue 25,350,000 shares of capital stock, consisting of 25,000,000 shares of common stock, par value \$0.001 per share, 230,000 shares of undesignated preferred stock (none of which are currently outstanding), 10,000 shares of Series B Convertible Preferred Stock, par value \$0.05 per share (none of which are currently outstanding), 10,000 shares of Series C Convertible Preferred Stock, par value \$0.05 per share (none of which are currently outstanding), and 100,000 shares of Series A Junior Participating Preferred Stock, par value \$0.001 per share.

Our common stock is listed on The Nasdaq Capital Market under the symbol "SNGX." Our common stock warrants issued in December 2016 are listed on The Nasdaq Capital Market under the symbol "SNGXW". All outstanding shares of common stock are validly issued, fully paid, and nonassessable.

Common Stock

Voting Rights

Holders of our common stock are entitled to one vote for each share held in the election of directors and in all other matters to be voted on by the stockholders. There is no cumulative voting in the election of directors. The affirmative vote of the holders of a plurality of the shares of common stock represented at an annual meeting is required to elect each director.

Dividends and Liquidation Rights

Holders of common stock are entitled to receive dividends as may be declared from time to time by our board of directors out of funds legally available therefor. In the event of liquidation, dissolution or winding up of the corporation, holders of common stock are to share in all assets remaining after the payment of liabilities.

Conversion, Redemption and Other Rights

Holders of common stock have no pre-emptive or conversion rights and are not subject to further calls or assessments. There are no redemption or sinking fund provisions applicable to the common stock. The rights of the holders of the common stock are subject to any rights that may be fixed for holders of preferred stock.

Preferred Stock

Our Certificate of Incorporation authorizes the issuance of 230,000 shares of undesignated preferred stock, 10,000 shares of Series B Convertible Preferred Stock, par value \$0.05 per share ("Series B Preferred Stock"), 10,000 shares of Series C Convertible Preferred Stock, par value \$0.05 per share ("Series C Preferred Stock"), and 100,000 shares of Series A Junior Participating Preferred Stock, par value \$0.001 per share ("Junior Preferred Stock"). Our board of directors is empowered, without stockholder approval, to designate and issue additional series of preferred stock with dividend, liquidation, conversion, voting or other rights, including the right to issue convertible securities with no limitations on conversion, which could adversely affect the voting power or other rights of the holders of our common stock, substantially dilute a common stockholder's interest and depress the price of our common stock.

No shares of the Series B Preferred Stock, the Series C Preferred Stock or the Junior Preferred Stock are outstanding. Due to the terms of the Series C Preferred Stock, no additional shares of Series C Preferred Stock can be issued.

Series B Preferred Stock

Our Certificate of Incorporation authorizes the issuance of 10,000 shares of Series B Preferred Stock, none of which are outstanding and 6,411 of which have been converted to common stock and therefore are not reissuable.

Voting Rights

Each holder of Series B Preferred Stock is entitled to the number of votes equal to the number of whole shares of common stock into which the shares of Series Preferred Stock held by such holder is then convertible (as adjusted from time to time pursuant to our Certificate of Incorporation) with respect to any and all matters presented to the stockholders for their action or consideration. Except as provided by law, holders of Series B Preferred Stock vote together with the holders of common stock as a single class.

Dividends and Liquidation Rights

The holders of the Series B Preferred Stock are entitled to a dividend of 8% per annum, payable annually in shares of Series B Preferred Stock. In addition, when and if our board of directors shall declare a dividend payable with respect to the then outstanding shares of common stock, the holders of the Series B Preferred Stock are entitled to the amount of dividends per share as would be payable on the largest number of whole shares of common stock into which each share of Series B Preferred Stock could then be converted.

In the event of liquidation, dissolution or winding up of the company, the holders of Series B Preferred Stock then outstanding will be entitled to be paid an amount equal to \$1,000 per share (subject to adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization affecting such shares pursuant to our Certificate of Incorporation), plus any dividends declared but unpaid thereon before any payment is made to the holders of common stock, Junior Preferred Stock or any other class or series of stock ranking on liquidation junior to the Series B Preferred Stock. After the holders of the Series B Preferred Stock have been paid in full, the remaining assets of the company will be distributed to the holders of Junior Preferred Stock and common stock, subject to the preferences of the Junior Preferred Stock.

Conversion, Redemption and Other Rights

Each share of Series B Preferred Stock is convertible into 1.333 shares of common stock. The conversion ratio is subject to an adjustment upon the issuance of additional shares of common stock for a price below the closing price of the common stock and equitable adjustment for stock splits, dividends, combinations, reorganizations and similar events.

Subject to certain conditions, after the second anniversary of the issuance of the Series B Preferred Stock, the Company will have the right, but not the obligation, to redeem the then-outstanding shares of Series B Preferred Stock for cash in an amount calculated pursuant to the terms of our Certificate of Incorporation.

Junior Preferred Stock

Voting Rights

The holders of the Junior Preferred Stock will have 10,000 votes per share of Junior Preferred Stock on all matters submitted to a vote of our stockholders, including the election of directors.

Dividends and Liquidation Rights

If our board of directors declares or pays dividends on common stock, the holders of the Junior Preferred Stock would be entitled to receive a per share dividend payment of 10,000 times the dividend declared per share of common stock. In the event we make a distribution on the common stock, the holders of the Junior Preferred Stock will be entitled to a per share distribution, in like kind, of 10,000 times such distribution made per share of common stock. In the event of any merger, consolidation or other transaction in which shares of common stock are exchanged, each share of Junior Preferred Stock will be entitled to receive 10,000 times the amount received per share of common stock. These rights are protected by customary anti-dilution provisions.

Upon any liquidation, dissolution or winding up, no distribution may be made to the holders of shares of stock ranking junior to the Junior Preferred Stock unless the holders of the Junior Preferred Stock have received the greater of (i) \$37.00 per one one-thousandth share plus an amount equal to accrued and unpaid dividends and distributions thereon, and (ii) an amount equal to 10,000 times the aggregate amount to be distributed per share to holders of common stock. Further, no distribution may be made to the holders of stock ranking on a parity upon liquidation, dissolution or winding up with the Junior Preferred Stock, unless distributions are made ratably on the Junior Preferred Stock and all other shares of such parity stock in proportion to the total amounts to which the holders of the Junior Preferred Stock are entitled above and to which the holders of such parity shares are entitled.

Outstanding Warrants

2016 Warrants

On December 16, 2016, we consummated a public offering of an aggregate of 1,670,000 shares of common stock, together with warrants to purchase up to 2,370,005 shares of common stock. In connection with the offering, we also issued the underwriter a warrant to purchase up to 33,400 shares of common stock. We refer to the warrants issued to the investors and the underwriter in connection with the offering as the “2016 Warrants.” The 2016 Warrants are listed on The Nasdaq Capital Market under the symbol “SNGXW”.

As of March 23, 2020, 2,403,405 shares of common stock remained issuable upon the exercise of the 2016 Warrants. The 2016 Warrants expire in 2021.

As of March 23, 2020, the exercise price of the 2016 Warrants was \$3.95 per share. The exercise price and the number of shares of common stock purchasable upon the exercise of each 2016 Warrant are subject to adjustment upon the happening of certain events, such as stock dividends, distributions, and splits.

Other Warrants

As of March 23, 2020, 3,483,412 shares of common stock were issuable upon the exercise of warrants other than the 2016 Warrants. Such warrants expire between 2022 and 2023. As of March 23, 2020, the weighted average exercise price of such warrants was \$2.20 per share. The exercise price and the number of shares of common stock purchasable upon the exercise of each such warrant are subject to adjustment upon the happening of certain events, such as stock dividends, distributions, and splits.

Anti-Takeover Provisions

Provisions in our Certificate of Incorporation and Bylaws may discourage certain types of transactions involving an actual or potential change of control of our company which might be beneficial to us or our security holders.

As noted above, our Certificate of Incorporation permits our board of directors to issue shares of any class or series of preferred stock in the future without stockholder approval and upon such terms as our board of directors may determine. The rights of the holders of common stock will be subject to, and may be adversely affected by, the rights of the holders of any class or series of preferred stock that may be issued in the future.

Our Bylaws generally provide that any board vacancy, including a vacancy resulting from an increase in the authorized number of directors, may be filled by a majority of the directors, even if less than a quorum.

Additionally, our Bylaws provide that stockholders must provide timely notice in writing to bring business before an annual meeting of shareholders or to nominate candidates for election as directors at an annual meeting of shareholders. Notice for an annual meeting is timely if our Secretary receives the written notice not less than 45 days and no more than 75 days prior to the anniversary of the date that we mailed proxy materials for the preceding year’s annual meeting. However, if the date of the annual meeting is advanced more than thirty (30) days prior to, or delayed by more than thirty (30) days after, the anniversary of the preceding year’s annual meeting, notice by the stockholder to be timely must be delivered not later than the close of business on the later of (i) the 90th day prior to such annual meeting or (ii) the 10th day following the day on which public announcement of the date of such annual meeting is first made. Our Bylaws also specify the form and content of a shareholder’s notice. These provisions may prevent shareholders from bringing matters before an annual meeting of shareholders or from making nominations for directors at an annual meeting of shareholders.

Delaware Anti-Takeover Statute

We are subject to the provisions of Section 203 of the Delaware General Corporation Law regulating corporate takeovers. In general, Section 203 prohibits a publicly held Delaware corporation from engaging, under certain circumstances, in a business combination with an interested stockholder for a period of three years following the date the person became an interested stockholder unless:

- prior to the date of the transaction, our board of directors approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder;
- upon completion of the transaction that resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, calculated as provided under Section 203; or
- at or subsequent to the date of the transaction, the business combination is approved by our board of directors and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least two-thirds of the outstanding voting stock which is not owned by the interested stockholder.

Generally, a business combination includes a merger, asset or stock sale, or other transaction resulting in a financial benefit to the interested stockholder. An interested stockholder is a person who, together with affiliates and associates, owns or, within three years prior to the determination of interested stockholder status, did own 15% or more of a corporation's outstanding voting stock. We expect the existence of this provision to have an anti-takeover effect with respect to transactions our board of directors does not approve in advance. We also anticipate that Section 203 may also discourage attempts that might result in a premium over the market price for the shares of common stock held by stockholders.

Transfer Agent

The transfer agent and registrar for our common stock is American Stock Transfer & Trust Company, LLC. Its address is 6201 15th Avenue, Brooklyn, NY 11219 and its telephone number is (718) 921-8200.

SUBSIDIARIES OF SOLIGENIX, INC.

The following represents a list of Soligenix, Inc.'s subsidiaries:

Name	Ownership		State of Incorporation
Enteron Pharmaceuticals, Inc.	100.00	%	Delaware
Orasomal Technologies Inc.	75.30	%	Delaware
DOR BioDefense Corp.	100.00	%	Delaware
Soligenix BioPharma Canada Incorporated	100.00	%	Canada
Soligenix UK Limited	100.00	%	United Kingdom

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in the Registration Statements of Soligenix, Inc. on Form S-1 (Nos. 333-214038, 333-215059, 333-225226), Form S-3 (No. 333-217738) and Form S-8 (Nos. 333-130801, 333-196941 and 333-208515) of our report dated March 30, 2020, on our audits of the consolidated financial statements as of December 31, 2019 and 2018 and for each of the years then ended, which report is included in this Annual Report on Form 10-K to be filed on or about March 30, 2020.

/s/ EisnerAmper LLP

EISNERAMPER LLP
Iselin, New Jersey
March 30, 2020

**CERTIFICATION PURSUANT TO RULE 13a-14(a)/15d-14(a)
OF THE SECURITIES EXCHANGE ACT OF 1934**

I, Christopher J. Schaber, Ph.D., certify that:

1. I have reviewed this Form 10-K of the Soligenix, Inc. for the fiscal year ended December 31, 2019;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

March 30, 2020

/s/ Christopher J. Schaber

Christopher J. Schaber, Ph.D.

President and Chief Executive Officer

**CERTIFICATION PURSUANT TO RULE 13a-14(a)/15d-14(a)
OF THE SECURITIES EXCHANGE ACT OF 1934**

I, Jonathan Guarino, certify that:

1. I have reviewed this Form 10-K of the Soligenix, Inc. for the fiscal year ended December 31, 2019;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

March 30, 2020

/s/ Jonathan Guarino

Jonathan Guarino

Senior Vice President and Chief Financial Officer

**CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED
PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with this Form 10-K of Soligenix, Inc. (the "Company") for the fiscal year ended December 31, 2019, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned hereby certifies, pursuant to 18 U.S.C. Section 1350, that:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

March 30, 2020

/s/ Christopher J. Schaber

Christopher J. Schaber, Ph.D.

President and Chief Executive Officer

**CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED
PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with this Form 10-K of Soligenix, Inc. (the “Company”) for the fiscal year ended December 31, 2019, as filed with the Securities and Exchange Commission on the date hereof (the “Report”), the undersigned hereby certifies, pursuant to 18 U.S.C. Section 1350, that:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

March 30, 2020

/s/ Jonathan Guarino

Jonathan Guarino

Senior Vice President and Chief Financial Officer