

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

FORM 10-K

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

For the fiscal year ended December 31, 2016

OR

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

For the transition period from to

Commission File Number: 001-38022

MATINAS BIOPHARMA HOLDINGS, INC.
(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

No. 46-3011414
(I.R.S. Employer
Identification No.)

1545 Route 206 South, Suite 302
Bedminster, New Jersey 07921
(Address of principal executive offices) (Zip Code)

908-443-1860
(Registrant's telephone number, including area code)

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

<u>Title of Class:</u>	<u>Name of Each Exchange on Which Registered:</u>
Common Stock, par value \$0.0001	NYSE MKT LLC

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

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

Yes No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 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 and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files).

Yes No

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

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions 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 (Do not check if a smaller reporting company) Smaller reporting company

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

The aggregate market value of the registrant's voting and non-voting common stock held by non-affiliates of the registrant computed by reference to the price at which the common stock was last sold on June 30, 2016 was approximately \$27.7 million.

As of March 15, 2017 there were 89,055,327 shares of the registrant's common stock, \$0.0001 par value, outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

None.

MATINAS BIOPHARMA HOLDINGS, INC.

Annual Report on Form 10-K

Fiscal Year Ended December 31, 2016

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PART I

CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This report on Form 10-K contains forward-looking statements made pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995 under Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. Forward-looking statements include statements with respect to our beliefs, plans, objectives, goals, expectations, anticipations, assumptions, estimates, intentions and future performance, and involve known and unknown risks, uncertainties and other factors, which may be beyond our control, and which may cause our actual results, performance or achievements to be materially different from future results, performance or achievements expressed or implied by such forward-looking statements. All statements other than statements of historical fact are statements that could be forward-looking statements. You can identify these forward-looking statements through our use of words such as “may,” “can,” “anticipate,” “assume,” “should,” “indicate,” “would,” “believe,” “contemplate,” “expect,” “seek,” “estimate,” “continue,” “plan,” “point to,” “project,” “predict,” “could,” “intend,” “target,” “potential” and other similar words and expressions of the future.

There are a number of important factors that could cause the actual results to differ materially from those expressed in any forward-looking statement made by us. These factors include, but are not limited to:

- our ability to raise additional capital to fund our operations and to develop our product candidates;
- our anticipated timing for preclinical development, regulatory submissions, commencement and completion of clinical trials and product approvals;
- our history of operating losses in each year since inception and the expectation that we will continue to incur operating losses for the foreseeable future;
- our dependence on product candidates, which are still in an early development stage;
- our reliance on proprietary cochleate drug delivery technology, which is licensed to us by Rutgers University;
- our ability to manufacture GMP batches of our product candidates which are required for pre-clinical and clinical trials and, subsequently, if regulatory approval is obtained for any of our products, our ability to manufacture commercial quantities;
- our ability to complete required clinical trials for our lead product candidate and other product candidates and obtain approval from the FDA or other regulatory agents in different jurisdictions;
- our expectations of the attributes of our product and development candidates, including pharmaceutical properties, efficacy, safety and dosing regimens;
- our dependence on third-parties, including third-parties to manufacture and third-party CROs (including, without limitation, the National Institutes of Health (NIH) to conduct our clinical trials;
- our ability to maintain or protect the validity of our patents and other intellectual property;
- our ability to retain and recruit key personnel;
- our ability to internally develop new inventions and intellectual property;
- interpretations of current laws and the passages of future laws;
- our lack of a sales and marketing organization and our ability to commercialize products, if we obtain regulatory approval, whether alone or through potential future collaborators;

- Our ability to successfully commercialize, and our expectations regarding future therapeutic and commercial potential with respect to, our product candidates;
- the accuracy of our estimates regarding expenses, ongoing losses, future revenue, capital requirements and our needs for or ability to obtain additional financing;
- developments and projections relating to our competitors or our industry
- our ability to adequately support growth; and
- the factors listed under the headings “Risk Factors” elsewhere in this report and other reports that we file with the Securities and Exchange Commission.

These forward-looking statements reflect our management’s beliefs and views with respect to future events and are based on estimates and assumptions as of the date of this Annual Report on Form 10-K and are subject to risks and uncertainties. We discuss many of these risks in greater detail under “Risk Factors.” Moreover, we operate in a very competitive and rapidly changing environment. New risks emerge from time to time. It is not possible for our management to predict all risks, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements we may make. Given these uncertainties, you should not place undue reliance on these forward-looking statements.

You should read this Annual Report on Form 10-K and the documents that we reference and have filed as exhibits to the Annual Report on Form 10-K completely and with the understanding that our actual future results may be materially different from what we expect. We qualify all of the forward-looking statements in this Annual Report on Form 10-K by these cautionary statements. Except as required by law, we undertake no obligation to publicly update any forward-looking statements, whether as a result of new information, future events or otherwise.

Item 1. Business

Company Overview

We are a clinical-stage biopharmaceutical company focused on developing innovative anti-infectives for orphan indications. Our product and development candidates are derived using our unique and proprietary lipid-crystal nano-particle, or cochleate, formulation platform delivery technology. Our proprietary cochleate delivery technology platform, licensed from Rutgers University on an exclusive worldwide basis, nano-encapsulates drugs and is designed to make these drugs orally bioavailable, well tolerated and safer and less toxic while providing targeted and safe delivery of pharmaceuticals directly to the site of infection or inflammation. We believe our cochleate technology provides us with an efficient and broadly applicable drug delivery platform, with particular utility in diseases and conditions in which the immune system plays a significant modulation role and where the immune system facilitates the active transport of our lipid crystal nano-particles throughout the body.

Currently, we are focused on the anti-infective market and on drug candidates which we believe demonstrate the value and innovation associated with our unique cochleate delivery platform technology while potentially providing significant health economic benefit to the health care system. We believe initially focusing on the anti-infective market has distinct advantages for the development of products which meet significant unmet medical need, including:

- a current regulatory environment which provides small development and clinical stage companies incentives such as significant periods of regulatory marketing exclusivity and opportunities to reduce development cost and timeline to market for anti-infective drug candidates;

- traditional high correlation between efficacy and safety data in preclinical animal models and the outcome of human clinical trials with anti-infective product candidates;
- attractive commercial opportunities for anti-infective product differentiated in safety profile, mode of action and oral bioavailability positioned against current therapies with significant side effects, or drug to drug interactions, limited efficacy and intravenous delivery resulting in lack of convenience, compliance and at a significant burden to the cost of healthcare; and
- an ability to commercialize anti-infective products with a focused and cost-efficient sales and marketing organization.

MAT2203 and MAT2501

We leveraged our platform cochleate delivery technology to develop two clinical-stage products that we believe have the potential to become best-in-class drugs. Our lead product candidate MAT2203 is an orally-administered cochleate formulation of a broad spectrum anti-fungal drug called amphotericin B. We are initially developing MAT2203 for the treatment of serious fungal infections as well as the prevention of invasive fungal infections (IFIs) due to immunosuppressive therapy. We are currently conducting two Phase 2 clinical trials involving MAT2203 and expect to report interim results from our open label NIH run Phase 2a clinical trial and topline results from our ongoing Phase 2 study of MAT2203 in Vulvovaginal Candidiasis in the first half of 2017.

Our second clinical stage product candidate is MAT2501, an orally administered, encochleated formulation of the broad spectrum aminoglycoside antibiotic amikacin which may be used to treat different types of multidrug-resistant bacteria, including non-tuberculous mycobacterium infections (NTM), as well as various multidrug-resistant gram negative and intracellular bacterial infections. We recently completed and announced topline results from a Phase 1 single escalating dose clinical trial of MAT2501 in healthy volunteers in which no serious adverse events were reported and where oral administration of MAT2501 at all tested doses yielded blood levels that were well below the safety levels recommended for injected amikacin, supporting further development of MAT2501 for the treatment of NTM infections.

Strategy

Our goal is to become a fully integrated biopharmaceutical company that discovers, develops and commercializes novel anti-infective medicines using our proprietary cochleate delivery platform technology. Key elements of our strategy include:

- **Rapidly advance our initial antifungal and antibacterial candidates to obtain regulatory approval to commercialize these products in areas of significant unmet medical need supported by significant regulatory exclusivity.** We plan to leverage the favorable regulatory environment for anti-infectives to expedite the development of our product candidates. We are focused on completing the ongoing Phase 2 clinical trials with MAT2203 and advancing MAT2501 additional clinical studies during 2017. We intend to target those indications which, if approved, would result in being able to take advantage of the 12 years of product exclusivity afforded through FDA designation as a QIDP and Orphan drug product;
- **Invest in our cochleate lipid-crystal nanoparticle delivery platform.** We believe that our novel and proprietary cochleate delivery platform has broad potential applications across a wide spectrum of compounds and therapeutic areas including other infectious diseases, such as viral infections, as well as with vaccines, including the influenza vaccine, oligonucleotides (such as siRNAs) and anti-inflammatory agents (such as NSAIDs). We intend to pursue and strengthen our pipeline using our technology, either alone or through strategic partnerships. In addition, we expect to continue to establish important intellectual property related to this platform, its applications and development candidates.
- **Develop and grow our ability to manufacture products utilizing our proprietary delivery platform technology.** We plan to continue to invest in maintaining our own cGMP facility in order to supply products for clinical development and, ultimately, commercial production in an effort to retain exclusive knowledge of the process and intellectual property associated with our platform delivery technology;

· **Commercialize products in the United States with a specialized sales force.** The indications and markets we intend to pursue with our lead anti-infective product candidates benefit from an ability to address large commercial opportunities with a relatively small and targeted sales organization. As we continue to rapidly advance our product candidates through development, we intend to build and manage a focused and specialized sales and marketing organization to commercialize our products, if approved, in the United States in both the hospital and outpatient care settings. In geographies outside the United States, we may seek to collaborate with other parties to commercialize our products.

Our Anti-Infective Product Candidates

MAT2203

Product Profile

MAT2203 is an orally-administered, encochleated formulation of amphotericin B (a broad spectrum fungicidal agent). Little to no clinical resistance has been reported to date with amphotericin B as compared to the rapidly emerging drug resistance seen in other antifungal therapies. Currently, IV-only administered amphotericin B is the only broad spectrum fungicidal available but its IV-delivery results in significant treatment-limiting side effects, including nephrotoxicity. The ability to provide amphotericin B orally using our proprietary and novel oral formulation may offer a new and promising alternative for patients and doctors. In a clinical Phase 1 single-dose, double-blind, dose-escalating, pharmacokinetic study of 48 healthy volunteers, oral MAT2203 demonstrated a positive safety and tolerability profile with no serious adverse events reported, without any observed nephrotoxicity.

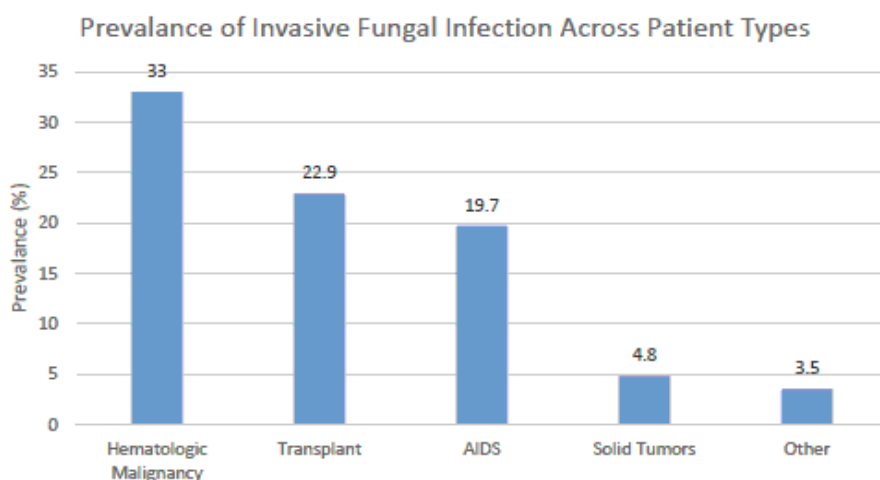
Antifungal Market Opportunity

The overall global antifungal market accounted for \$10.7 billion in 2015 with estimated annual worldwide sales of prescription systemic antifungal drugs reaching \$3.7 billion. This includes therapies used as active treatment or prophylaxis (preventive) in the inpatient and outpatient setting, therapies used for the treatment of hospitalized patients and therapies used for the treatment of patients who are being discharged from the hospital. We estimate that, each year, there are over 1.5 million cases of invasive fungal infections caused by various species of *Candida*, *Aspergillus* and *Cryptococcus*, the three most common invasive fungal pathogens, globally. The estimated incidence in the U.S. for these conditions is approximately 46,000 for invasive candidiasis, 6,000 for invasive aspergillosis, and 3,000 for cryptococcal meningitis. The rapid progression of disease and high mortality rates (20% - 50%) associated with documented invasive fungal infections often result in antifungal therapy being administered in suspected (unconfirmed) cases or as a preventative measure in patients at high risk. Also, the increasingly widespread use of immune suppressive drugs as cancer chemotherapy or for organ transplantation or treatment of autoimmune disease has resulted in an increasing population of patients at risk for invasive fungal infections. Furthermore, the limited number of systemic antifungal drug classes, consisting of azoles, echinocandins and polyenes, and their extensive use, has led to increased numbers of infections with drug-resistant strains. The Centers for Disease Control and Prevention (CDC) has listed fluconazole-resistant *Candida* as a serious threat requiring prompt and sustained action and has also identified a rise in echinocandin resistance, especially among *Candida glabrata*. In June 2016, the CDC issued an extraordinary alert for healthcare facilities and providers to be on the lookout for patients with *Candida auris*, a multidrug resistant strain with high mortality (approximately 60%). Almost half of *C. auris* isolates are multidrug resistant to two or more antifungal classes (large majority resistant to fluconazole, 40% resistant to echinocandins), stressing the urgent need for new agents with activity against resistant strains and that be administered with significant less toxicity and the potential to discharge patients earlier to reduce hospital stays and costs.

The following is a discussion of serious fungal infections and the limitations of the current treatments for each:

- Invasive Candidiasis is a serious fungal infection that occurs in immunocompromised patients. Current treatment guidelines in the U.S. and in Europe recommend the use of echinocandins (the only glucan synthase inhibitor currently commercially available) as the initial first-line therapy for invasive candidiasis. The main limitation of the echinocandin class is that only IV administration is available, limiting the flexibility of stepping down to an oral therapy in the same treatment class. The ability to step down to an oral therapy is important because it allows patients to be discharged from the hospital, as IV administration generally must occur in the hospital. The only option currently available to step down to an oral therapy after initial IV echinocandin are the azoles (the only class orally bioavailable), which have reported an increased frequency of resistant isolates, and are associated with increased risk of drug-drug interactions and toxicities, thus creating a gap in optimal treatment options for patients that could benefit from an orally administered effective antifungal agent.

- Invasive Aspergillosis is a serious fungal infection that occurs in immunocompromised patients. Current treatment guidelines in the U.S. and in Europe recommend the use of azoles (itraconazole, voriconazole or isavuconazole) as the initial first-line therapy for invasive aspergillosis. The main limitation of the azole class is that it is associated with increased risk of drug-drug interactions and toxicities, thus creating a gap in optimal treatment options for patients that could benefit from an orally administered safe and effective antifungal agent. The sub-optimal toxicity profile of the azoles has a greater impact for invasive aspergillosis patients given that they typically receive antifungal therapy for long durations (up to four months).
- The incidence of hematologic malignancies has become a driver of the invasive fungal infection (IFI) rate in the U.S. According to estimates by the American Cancer Society, approximately 170,000 new hematologic malignancy cases occurred in 2016, resulting in approximately 58,000 deaths. The percentage of patients with hematologic malignancies who develop IFI has increased dramatically in recent decades. This increase of the IFI rate is attributed to host defense impairment due to more intensive use of cytotoxic chemotherapies, hematopoietic stem cell transplantation (HSCT), ablative radiation therapy, corticosteroids, cyclosporine, and new immunosuppressive agents. *Candida* species have been the main cause of IFI, but recent autopsy and epidemiological findings indicate that an increasing number of infections are being caused by molds. Most are attributed to *Aspergillus* species, and such infections have become a prime cause of death in patients with hematologic malignancies.



Adapted from Lehmbacher et al. 2010.

IFI in immunosuppressed patients is a source of significant mortality and represents an area of critical unmet medical need. The incidence of IFI in immunosuppressed patients is increasing and mortality rates remain high, despite advances in antifungal treatment. A new improved broad-spectrum antifungal therapy with a favorable safety profile, fewer drug to drug interactions and a more convenient route of delivery is needed for the prevention of IFI in immunosuppressed patients.

Our Solution – MAT2203

Our lead anti-infective product candidate, MAT2203, is an application of our cochleate delivery technology to a broad spectrum anti-fungal drug called amphotericin B. Amphotericin B is an IV administered drug used as a last resort for treatment of systemic fungal infections resistant to triazoles and echinocandins, including resistant candidiasis, cryptococcal meningitis, aspergillosis and leishmaniasis. To date, there have been little to no reports of clinically observed drug-resistance to amphotericin B, further bolstering the use of this compound as the most likely last resort treatment for fungal infections in the foreseeable future. However, the use of amphotericin B is relatively limited because it is currently only available as an IV-administered product and has documented history of severe toxicity (including nephrotoxicity, or a poisonous potentially lethal effect on the kidneys). Encapsulating the amphotericin B drug with our cochleate delivery technology provides a potential opportunity for the drug to be taken orally with targeted delivery to infected cells, which we believe may have fewer side effects than the currently available IV-formulations of amphotericin B. Encapsulation of amphotericin B changes the bio-distribution, resulting in a higher level of the drug at the site of infection and a lower level of circulating amphotericin B. By reducing the amount of circulating drug, cochleates reduce overall toxicity. Importantly, drug concentrations will be high only in tissues due to the migratory nature of macrophages to inflammatory regions. We believe MAT2203 offers improved safety and significantly reduced toxicity and, as a result, we believe MAT2203 will be able to offer a categorically different formulation that delivers orally administered amphotericin B, directly to the target cell at the site of infection. A similar distribution pattern has been described for azithromycin where *in vitro* and *in vivo* models have demonstrated that azithromycin is taken up, transported and released at the sites of infection by phagocytic cells such as neutrophils and macrophages. This then leads to rapid distribution into the tissue and high concentrations within cells which yields significantly higher azithromycin concentration in tissue than in plasma or serum.

We believe that MAT2203 has the potential to be a best-in-class therapy for both prophylaxis (preventive) and treatment of invasive fungal infections by offering the following key benefits.

- **Potential to treat resistant pathogens.** We believe that MAT2203 can be used to prevent and treat fungal infections caused by drug resistant fungi, including those resistant to existing azoles and echinocandins, due to amphotericin B's fungicidal (i.e. killing the fungi) nature and potency against resistant strains and the ability of our cochleate drug delivery platform to provide higher and safer drug exposure early in the course of therapy.
- **Enabling prophylaxis regimens.** Many patients cannot receive azole prophylactic therapy due to drug to drug interactions or poor tolerability, while the long term preventative use (6-14 weeks) of IV echinocandins is impractical and expensive. Amphotericin B is known to have limited drug to drug interactions. We therefore expect that our orally available MAT2203 could provide for better prophylactic therapy on an inpatient and outpatient basis, particularly for those patients with a hematologic malignancy, such as leukemia.
- **Single agent treatment.** Rather than treating patients with an IV echinocandin followed by an oral azole solely to enable earlier hospital discharge, MAT2203 is expected to allow physicians to either begin treatment with a safe and effective broad spectrum antifungal or use MAT2203 as a preventative treatment in those patients who are most susceptible to contracting a serious or deadly IFI due to immunosuppressive therapy.
- **Shorter and less costly hospital stays and lower outpatient costs.** By providing physicians and patients with access to an orally available, broad spectrum fungicidal agent in MAT2203, there is the potential to significantly reduce hospital costs, which account for over 70% of the overall treatment cost of invasive candidiasis.

The FDA has granted MAT2203 designations for Qualified Infectious Disease Product, or QIDP, and Fast Track for the treatment of invasive candidiasis and aspergillosis and for the prevention of IFIs in patients on immunosuppressive therapy. We have also applied for Orphan Drug Designation for MAT2203. The orphan drug designation provides eligibility for seven years of market exclusivity in the United States upon FDA approval, a waiver from payment of user fees, an exemption from performing clinical studies in pediatric patients, and tax credits for the cost of the clinical research. The QIDP designation, provided under the Generating Antibiotic Incentives Now Act, or the GAIN Act, offers certain incentives for the development of new antibacterial or antifungal drugs, including eligibility for Fast Track designation, priority review and, if approved by the FDA, eligibility for an additional five years of marketing exclusivity. Fast Track designation enables more frequent interactions with FDA to expedite drug development and review. Fast Track designation does not change the standards for approval and we can provide no assurances that we can maintain Fast Track designation for MAT2203 or that such designation will result in faster regulatory review. The seven-year period of marketing exclusivity provided through orphan designation, if granted, combined with an additional five years of marketing exclusivity provided by the QIDP designation positions MAT2203 with a potential for a total of 12 years of marketing exclusivity to be granted at the time of FDA approval.

Development History of MAT2203

MAT2203 was studied in animal model studies of various fungal infections including invasive candidiasis, aspergillosis, cryptococcal meningitis and visceral leishmaniasis.

The data from animal studies for MAT2203, our cochleate lipid-crystal nano-particle formulation of amphotericin B, indicate a significant side-effect advantage over amphotericin B formulations, which we believe is based on two phenomena:

- The lipid-crystal nano-particle is a solid particle, and does not significantly “leak” its drug content while circulating. The particle releases its medication pay-load only when inside the target cells, and thus protects the kidney and other sensitive tissues from many of the amphotericin B side effects.
- Because of this targeted approach, we have been able to significantly broaden the therapeutic window on a mg/kg basis as compared to IV amphotericin B formulations. We have observed equivalent efficacy at lower doses as well as been able to use doses of up to 10x the highest tolerable IV dose in animal model studies. A broad therapeutic dose window with a very mild toxicity profile gives physicians greater flexibility in treating their often critically ill patients.

In addition, in the vast majority of these animal studies the MAT2203 product was administered orally; in the many of these animal studies the MAT2203 product was administered via injections or infusion as a comparator versus oral administration. If confirmed in our ongoing Phase 2a human efficacy study, the oral formulation is a second major differentiator of our cochleate delivery technology which has the potential to offer significant health-economic benefit since patients do not need to stay in the hospital to receive the therapy. Because of these differentiators brought by the cochleate delivery technology, we believe that MAT2203, if eventually approved by the FDA, may be able to obtain a significant market share of the fungal infection treatment and prevention market.

An IND application for MAT2203 was filed with the Food and Drug Administration, or FDA, in late 2006. In a clinical Phase 1a single-dose, double-blind, dose-escalating, pharmacokinetic (PK) study of 48 healthy volunteers MAT 2203 demonstrated a positive safety and tolerability profile with no serious adverse events reported.

Current Development Plan for MAT2203 – Phase 2

We are currently partnering with the National Institutes of Health/National Institute of Allergy and Infectious Disease (NIH/NIAID) on a NIH/NIAID-funded Phase 2a clinical study with MAT2203 (CAMB) in patients with refractory mucocutaneous candidiasis. This study is ongoing and enrolling patients and is an open-label, dose-titration trial in up to 16 patients to study the efficacy, safety, and pharmacokinetics of oral CAMB in the treatment of mucocutaneous candidiasis (esophageal, oropharyngeal, or vulvovaginal). This study is open to patients aged 18 to 75 years who are refractory or intolerant to standard non-intravenous therapies will be enrolled. Patients will initially be treated in a short-term (up to 54 days) dose titration period starting at 200 mg/day, where the dose may be increased up to 800 mg/day in patients that do not respond clinically to the lower doses. Patients who do not respond clinically to the highest dose of drug will not be eligible for the protocol extension. Patients that respond to treatment and tolerate the study medication will be eligible to enter a long-term extension (up to 6-months). The primary objective of the trial is to assess the clinical response to treatment of mucocutaneous candidiasis infections in patients who are refractory or intolerant to standard non-intravenous therapies after treatment for 14-days with the highest titrated dosage of CAMB per patient. Secondary objectives include pharmacokinetics, mycological response, and safety. We expect interim results to be announced the first week of June 2017 at the ASM Microbe Scientific Meeting as part of a poster presentation submitted by the National Institutes of Allergy and Infectious Disease (NIAID).

In March 2017 we announced that the Institutional Review Board of the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health (NIH) granted approval for a 6-month open-label safety extension of this Phase 2a study being conducted by the NIH. Many of the patients enrolled or expected to enroll into this Phase 2a study have underlying immune-deficiencies that predispose them to chronic mucocutaneous candidiasis, and recurrence is highly likely after study drug is stopped. Therefore, study participants who are tolerating the MAT2203 and are clinical responders, will be permitted to enroll into a study extension for up to 6 months. The goal of this open-label extension is to assess the long-term safety and efficacy of MAT2203 in patients with chronic mucocutaneous candidiasis. Clinical evaluations will be conducted to assess clinical response and laboratory samples will be collected to assess microbiology response. In addition, adverse events will be collected and safety laboratory tests will be monitored. We believe that generating positive data for such a long term treatment with MAT2203 will provide a unique degree of differentiation. The original amphotericin b deoxycholate product is known to typically cause kidney toxicity over the course of a few weeks.

We are also currently conducting a Phase 2 trial of MAT2203 in patients with vulvovaginal candidiasis (VVC). This Phase 2 study is a randomized, multicenter, evaluator-blinded study of oral MAT2203 compared to oral fluconazole in adult female patients. We expect to enroll approximately 75 patients with a diagnosis of moderate to severe VVC and to randomize these patients into three treatment cohorts of 25 patients each. The first cohort will receive treatment with 200 mg of oral MAT2203 while a second cohort will receive 400 mg of oral MAT2203. The third cohort will be treated with oral fluconazole. The study will assess the efficacy, safety and tolerability of MAT2203 and topline results are expected to be announced in the first half of 2017.

We plan to conduct the following additional clinical studies of MAT2203:

MAT2203 Safety and Tolerability Trial in Patients with a Hematologic Malignancy. We expect to commence an additional Phase 2 during 2017 that will include patients being treated with a chemotherapy regimen that typically induces severe neutropenia (causing suppression of the immune-system) and subsequently puts patients at risk for developing an IFI. We expect to enroll approximately 12-to-16 patients into the multiple-dose protocol and the primary endpoint will be safety/tolerability. PK samples will also be collected and efficacy assessments will also be performed. The PK/tolerability data from this trial combined with the antifungal efficacy and PK data from the two ongoing Phase 2 mucocutaneous candidiasis trials will be used to potentially demonstrate that our orally administered MAT2203 has preserved the systemic antifungal efficacy of IV-amphotericin B in patients suffering from moderate to severe immunosuppression. Furthermore, we believe that the multiple dose Tolerability/PK trial in patients with hematologic malignancy will define the MAT2203 tolerability profile in the phase 3 target population – a population at high risk for developing an IFI.

After completing the previously described phase 2 trials an End-of-Phase 2 meeting will be scheduled with FDA to review our phase 3 study plans. We expect this meeting will be centered on a target indication for the prevention of IFI in patients with hematologic malignancy and we plan to commence a Phase 3 pivotal registration trial in 2018. We will also evaluate opportunities or need to conduct human drug-drug interaction studies and studies in patients with active invasive fungal infections to further support the broad clinical use of MAT2203 in IFI. Based on limited utility of currently approved antifungal therapies for the prevention of IFI due to significant drug-drug interactions or lack of oral dosing mode, we believe that our orally administered MAT2203 has the potential to become a highly differentiated therapy in the antifungal field upon FDA approval.

MAT2501 – Targeting Chronic and Acute Bacterial Infections

Product Profile

MAT2501, an orally-administered, encocleated formulation of the broad spectrum IV-only aminoglycoside antibiotic agent amikacin, utilizes the Company's proprietary, lipid-crystal, nanoparticle delivery technology. Amikacin is currently used to treat different types of chronic and acute bacterial infections, including Non-Tuberculous Mycobacterium (NTM) infections and various multidrug-resistant gram negative bacterial infections. IV-administered amikacin is associated with major side effects including nephrotoxicity and ototoxicity (permanent loss of hearing). MAT2501 is specifically designed to provide targeted delivery of the potent antibiotic amikacin while providing a significantly improved safety and tolerability profile. In preclinical studies MAT2501 demonstrated efficacy after oral bioavailability in murine models of both pulmonary (lung) and disseminated NTM infections. We recently announced results from our Phase 1 clinical study of MAT2501 in healthy volunteers. The FDA designated MAT2501 as a QIDP and an Orphan Drug for the treatment of NTM infections. We intend to initially develop MAT2501 for the treatment of NTM infections and are also exploring the development of MAT2501 for the treatment of a multi-drug resistant, gram negative bacterial infections. If approved, we believe MAT2501 would become the first orally bioavailable aminoglycoside and represent a significant improvement over existing therapies from a treatment and health economic perspective.

NTM Market Opportunity

Nontuberculous mycobacteria are naturally occurring organisms found in water, soil, plants and animals. NTM causes many serious and life-threatening diseases, including pulmonary disease, skin and soft tissue disease, joint infections and, in immunocompromised individuals, disseminated infection. The most common clinical manifestation of NTM disease is pulmonary, or lung, disease. NTM lung infection occurs when a person inhales the organism from their environment. While most people do not become ill, some individuals develop a slow, progressive and destructive disease when NTM infects the airways and lung tissue leading to inflammation in the respiratory system. Individuals susceptible to the infection often have an unknown defect in their lung structure or immune system, lung damage from a pre-existing chronic obstructive pulmonary disease (COPD), such as emphysema and bronchiectasis, or cystic fibrosis, or an immune deficiency disorder, such as HIV or AIDS.

There are about 50,000 to 90,000 people with NTM pulmonary disease in the United States, with a much higher frequency in older adults, and these numbers appear to be increasing. However, NTM can affect any age group. Without treatment, the progressive lung infection caused by NTM results in severe cough, fatigue, and often weight loss. In some people NTM infections can become chronic and require ongoing treatment. Treatment may be difficult because NTM bacteria may be resistant to many common types of antibiotics. Severe NTM lung disease can have a significant impact on quality of life and can be life-threatening in a manner similar to tuberculosis, a condition caused by related Mycobacterium species. There are no products specifically indicated for the treatment of pulmonary NTM disease in the U.S., Europe or Canada. Current guideline-based approaches involve multi-drug regimens that may cause severe side effects and treatments can be as long as two years or more. Importantly, as many as 40% of patients with NTM lung disease are refractory to the established 3-drug guideline treatment regimen, leaving a very significant unmet medical need.

MAT2501 is specifically designed to provide targeted delivery of the potent antibiotic amikacin while providing a significantly improved safety and tolerability profile, in order to allow for chronic dosing of this potent antibiotic agent. FDA guidance for developing medications for the treatment of patients with of NTM infections refractory to guideline therapy includes a treatment duration in the range of 12 to 18 months. The profile of MAT2501 was designed to allow for safe and tolerable use of amikacin during such long-term treatment.

Drug-Resistant Antibiotic Market Opportunity

Anti-bacterials, also called antibiotics, are drugs used to treat infections that are caused by bacteria. Prior to the introduction of the first antibiotics in the 1930s and 1940s, bacterial infections were often fatal, and invasive surgery was accompanied by a high risk of infectious complications. Today, antibacterials are used routinely to treat and prevent infection. According to IMS Health, antibiotics accounted for \$38.8 billion in sales globally in 2012, with healthcare providers prescribing 272 million courses of antibacterials in the United States alone.

There are two main varieties of bacteria, based on a common laboratory staining test known as the "Gram stain." Gram-positive bacteria are surrounded by a single lipid membrane and a thick cell wall. Common Gram-positive pathogens include *Staphylococcus aureus* (including methicillin-resistant strains), *Streptococcus* species, and *Clostridium difficile*. In contrast, Gram-negative bacteria are encircled by two lipid membranes, an inner membrane and an outer membrane, with a thinner cell wall in between. Gram-negative bacteria include *P. aeruginosa*, *A. baumannii*, and the *Enterobacteriaceae*, a family of related organisms that includes *E. coli*, *K. pneumoniae*, *Enterobacter*, *Salmonella*, and *Shigella* species. Each membrane in Gram-negative bacteria excludes different types of chemical entities, requiring Gram-negative active antibiotics to be specifically designed to permeate both membranes.

According to government agencies and physician groups, including the Center for Disease Control and Prevention (CDC) and Infectious Disease Society of America (IDSA), one of the greatest needs for new antibiotics is to treat carbapenem-resistant *Enterobacteriaceae*, or CRE, and other drug-resistant Gram-negative pathogens. CRE leads to mortality rates of up to 50% in patients with bloodstream infections. Based on the significant increase in resistance rates in recent years, we anticipate CRE will continue to be a major health problem. For example, CDC surveillance data indicates that the rate of carbapenem resistance in *Klebsiella* species, a member of the *Enterobacteriaceae*, increased from 1.6% to 10.4% in the hospital setting in the United States between 2001 and 2011.

Further, a plasmid-borne resistance gene, *mcr-1*, has been discovered in bacteria that are resistant to colistin, long considered a drug of last resort for the treatment of multi-drug resistant infections. The presence of the *mcr-1* gene and its ability to share its colistin resistance with other bacteria such as CRE raise the risk that pan-resistant bacteria could develop. The gene has been found primarily in *Escherichia coli*, but has also been identified in other members of the *Enterobacteriaceae* from human, animal, food and environmental samples on every continent.

According to the CDC, at least two million people each year in the United States acquire serious infections with bacteria that are resistant to one or more of the antibiotics designed to treat those infections, and each year, over 20,000 patients in the United States die from these infections. Similar problems exist throughout the world, and the World Health Organization has declared antibiotic resistance a threat to global health security. The development and spread of resistance is driven by the use of antibiotics. Once they arise, resistant bacteria can be transferred between patients and antibiotic resistance mechanisms can be transferred between bacterial species, thus increasing the problem.

Antibiotic-resistant infections not only cause significant morbidity and mortality, but also place a substantial cost burden on the healthcare system. In most cases, antibiotic-resistant infections require prolonged and/or costlier treatments, extend hospital stays, and necessitate additional doctor visits and higher healthcare expenditures compared with infections that are easily treatable with antibiotics. The CDC estimates that the excess annual cost resulting from these infections in the United States is as high as \$20 billion.

Governments, in collaboration with the private sector, have begun to respond to this significant and growing unmet medical need by creating governmental and non-governmental entities tasked with addressing the problem and progressing legislation for reimbursement and regulatory reform, and economic incentives.

In addition to the treatment of NTM, we are also exploring the development MAT2501 for the treatment of certain multi-drug resistant, gram negative bacterial infections. If approved, we believe MAT2501 would become the first orally bioavailable aminoglycoside and represent a significant improvement over existing therapies in an area of significant unmet medical need.

Development History for MAT2501

In preclinical studies MAT2501 demonstrated efficacy after oral administration in murine models of both pulmonary (lung) and disseminated NTM infections. MAT2501 also demonstrated efficacy in cell-based assays and studies in animals with both lung and disseminated *Mycobacterium avium* infections, the most prevalent organism causing NTM infections in humans. Recently, we announced additional positive efficacy results from the study of MAT2501 in an *in vitro* preclinical model of *Mycobacterium abscessus*. *Mycobacterium abscessus*, a species of multi-drug resistant nontuberculous mycobacteria, are emerging as an important global threat to individuals suffering from immunosuppression or with chronic disease, such as cystic fibrosis. Confirming these results using *in vivo* models will be an important step in the development of MAT2501 for the treatment of *Mycobacterium abscessus*. The positive results showing the efficacy of MAT2501 against *Mycobacterium abscessus* in an *in vitro* assay provide the required proof-of-concept (POC) validation needed to advance MAT2501 into *in vivo*, preclinical animal studies. Planning and preparation for these preclinical POC animal studies are in progress and will be done concurrently with continued clinical development of MAT2501 for the treatment of NTM.

Clinical Development Plan for MAT2501 – Phase 1

We are currently developing MAT2501 for the treatment of non-tuberculous mycobacterium (NTM) infections. We believe the most significant unmet medical need in this field is in patient with NTM lung disease which is refractory to the 3-drug IDSA guideline regimen. Our primary development goal is to obtain an indication for the treatment of patients with NTM lung disease refractory to standard guideline therapy.

Although several companies are developing inhaled anti-infective therapies for this use, we believe a significant unmet medical need remains due to the side-effects and lack of longer-term tolerability of such inhaled therapies. We believe our oral delivery technology allows for a highly differentiated and more convenient administration mode for patients who cannot be cured with the currently established therapeutic approach. We have established proof of principle of our oral dosing regimen in several pre-clinical studies of *Mycobacterium avium* infections in murine models of disseminated and lung-biofilm infections, which have formed the basis of our IND filing and subsequent QIDP and Orphan Drug designations for treatment of NTM infection by US FDA.

We have been supported by NIH funding through a preclinical services contract HHSN2722010000091 for in-vitro screening of the activity of MAT2501 against other *Mycobacterium* species, including *Mycobacterium abscessus*. *M. abscessus* a more rapidly growing organism which is spreading at a disproportional higher rate as compared to other *Mycobacterium* species, is an area of increasing medical concern. *Mycobacterium abscessus* is also becoming a significant problem in patients with cosmetic and orthopaedic surgery. Based on this successful in-vitro screening work, we recently announced continuation of this work in animal studies, with the aim to establish the efficacy of MAT2501 in a broad range of *Mycobacterium* species. We have also been awarded a research contract by the Cystic Fibrosis Foundation (CFF) to assess the efficacy of MAT2501 in cystic fibrosis animal models with lung infections caused by a range of *Mycobacterium* species. The rapid spread of *Mycobacterium abscessus* in cystic fibrosis patients is also a significant medical concern. We are collaborating with investigators from Colorado State University on preclinical infection models of multiple mycobacterium strains supported by NIH and CFF.

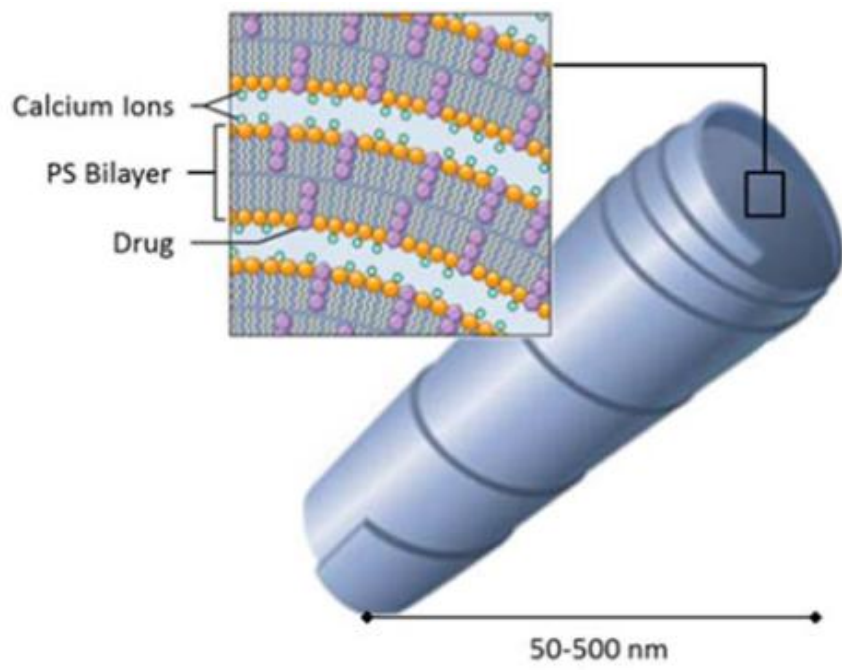
We recently announced topline results from our Phase 1 study with MAT2501. This Phase 1 study was a double-blind, placebo-controlled, single ascending dose study primarily aimed to evaluate the safety, tolerability, and pharmacokinetics of MAT2501 in healthy adult subjects. Secondary aims of the study included the effects of food on tolerability and pharmacokinetics. There were no serious adverse events reported in the study. Adverse events were mostly mild in severity and gastrointestinal (GI) in nature, as seen with previous cochleate Phase 1 studies. The incidence of such adverse events was significantly decreased when administered with food. Oral administration of MAT2501 at all three doses yielded blood levels that were well below the safety levels recommended for IV administered amikacin. The results of this study support the further development of MAT2501 for the treatment of NTM infections.

Next, we plan to initiate a multiple-ascending dose Phase 1 study to characterize the safety, tolerability and pharmacokinetics of MAT2501 over a more extended period in a dosing regimen that resembles the envisioned clinical use of the product. Upon future FDA meetings, we plan to initiate a Phase 2 study in patients with NTM lung disease refractory to guideline therapy. We also plan to evaluate opportunities or need to conduct human drug to drug interaction studies and studies in special patient populations, such as patients with cystic fibrosis or non-lung *Mycobacterium abscessus* infections. Based on limited success and utility of inhaled therapies in these uses, as well as the oral dosing mode of our product, we believe that MAT2501 has the potential to become a highly differentiated therapy for the treatment of NTM if approved by FDA.

Our Cochleate Delivery Technology

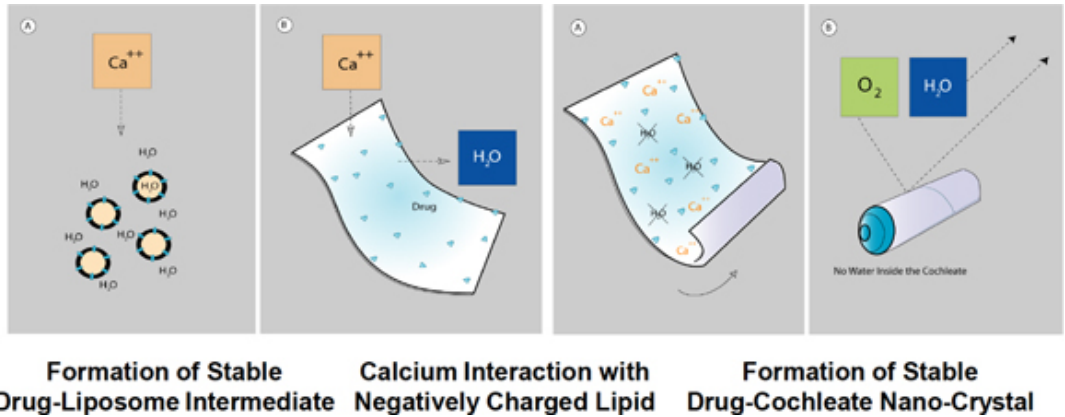
Cochleate lipid-crystal nano-particles are composed of simple, naturally occurring materials: phosphatidylserine (PS) and calcium. They are stable and have a unique multilayered structure consisting of a large, continuous, solid, lipid bilayer sheet rolled up in a spiral or as stacked sheets, with no internal aqueous space (Figure 1). This unique structure provides protection from degradation for “encochleated” molecules. Components within the interior of the cochleate remain intact, even though the outer layers of the cochleate may be exposed to harsh environmental conditions or enzymes.

Figure 1 Cochleate Formulation



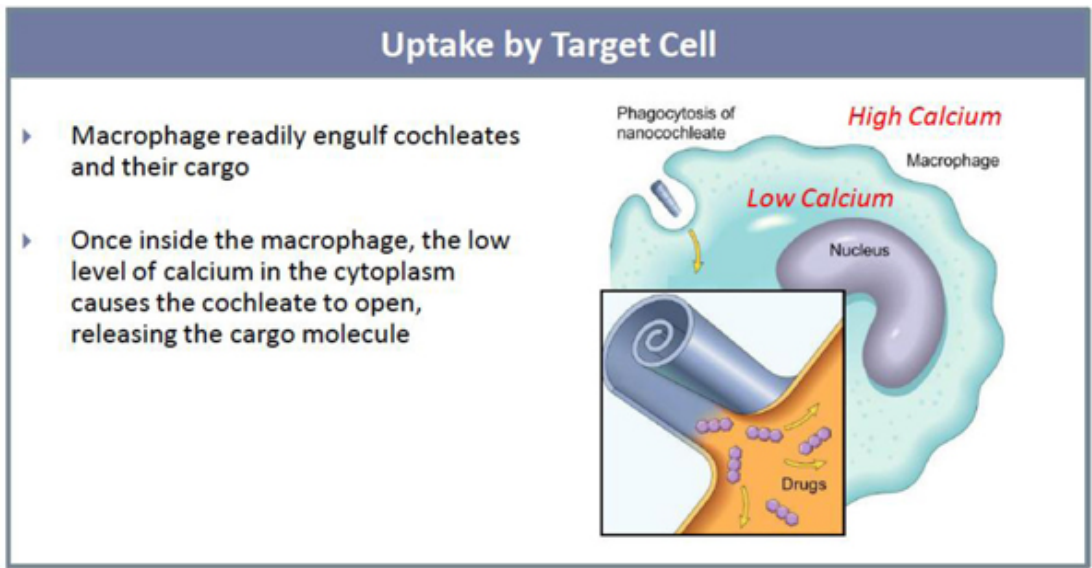
The structure is formed when a series of solid lipid sheets engulf drug molecules, a process referred to as “enochleation.” Enochleation, developed by Matinas and Rutgers New Jersey Medical School, involves combining calcium and soy-derived PS, two naturally occurring materials classified as GRAS (generally recognized as safe), through a stirring process to envelop the active pharmacological ingredient. The result is a nano-size enochleated drug formulation (Figure 2).

Figure 2 Formation of Cochleate



Cochleates have been shown to improve existing drugs by providing 1) cell targeted delivery; 2) reduced blood levels thereby reducing toxicity; and 3) oral delivery of drugs now only available intravenously. Cochleates work by encapsulating molecules of drugs in a solid, anhydrous, crystalline structure, protecting them as they pass through the gastrointestinal (GI) tract where they cross the mucous membrane. Once the cochleates have crossed the mucosal barrier of the GI tract into the lymphatic system, they are picked up by particle scavenging cells of the mononuclear phagocytic system, such as macrophages and dendritic cells. (Figure 3). Activated macrophages, with drug-cochleate inside, migrate to the site of infection or to the target organ and deliver amphotericin B.

Figure 3 Macrophage Uptake of Cochleates



Cells in the mononuclear phagocytic system are immune cells that have the capacity to engulf and destroy numerous potentially pathogenic materials and organisms within the body. These cells are found in almost every site of the body, save a few ‘immune privileged’ sites (e.g. eyes, fetus, and testes). Such cells help with non-specific (innate) immune defenses as well as help initiate specific (adaptive) immune responses, thus they play a critical role bridging the gap between innate and adaptive immune responses. Our core capabilities combine the use of lipids as active pharmaceutical ingredients (API) and the use of lipids in “cochleate-shaped” lipid-crystal nano-particle drug delivery vehicles. Therapeutic applications of our proprietary delivery technology are focused on the delivery of several potent and highly efficacious anti-fungal and anti-bacterial agents which, unfortunately, are currently still associated with serious side effects, including irreversible toxic effects on kidney and hearing function. Our technology may allow for the safe and targeted delivery of these agents, which positions us to be at the forefront of dealing with these very serious problems.

Our cochleate delivery technology is currently being used to encapsulate potent but dangerous anti-infective drugs in tiny lipid-crystals which are selectively picked up by cells in the mononuclear phagocytic system, such as macrophages, and transported to infected cells. These tiny lipid crystals are referred to as “cochleates.” Cochleates have a multilayer crystalline, spiral structure with no internal aqueous space. The structure is formed when a series of solid lipid sheets roll up and engulf drug molecules in between the sheets, a proprietary process referred to as “enocochleation”. The result is a lipid-crystal enocochleated drug formulation made up of nano-sized particles. We believe our cochleate delivery technology provides an effective delivery mechanism without chemically bonding or otherwise altering the drug. Because the medications are locked in the particles, the sensitive-organ exposure to these medications is believed to be drastically reduced, as well as the toxic side-effects. In summary, this unique technology offers (1) targeted delivery, (2) sensitive organ protection, and (3) oral formulation (even for IV-only medications).

Multi-organ Protection: The key innovation of our cochleate delivery technology is our ability to package medication inside lipid-crystal particles without leaking. Because of their crystal nature, these particles are truly solid and hold on tightly to their medication pay-load. This is where the cochleate delivery technology differs markedly from other lipid-based delivery technology, such as liposomal delivery. Liposomes are liquid delivery systems which typically leak some of their drug content into our circulatory systems, thus still exposing our vulnerable organs and tissues to toxic effects of often potent medications. Keeping organ-toxic medications inside the lipid-crystal particles strongly differentiates our cochleate delivery technology from other drug delivery approaches.

Targeted Delivery: The size of our individual cochleate lipid-crystals is typically in the range of 50-500 nm. This is very small and by comparison close to the size of a large virus or a small bacteria. Our body produces several cell-types that are designed to remove viruses and bacteria from our system. These cell types, such as macrophages, are part of our immune system and “swallow” the bacteria and viruses they encounter in order to protect us from infections. Because of the size our lipid-crystal cochleate particles and the phospholipid surface structure (the cell membranes of bacteria are also made up from phospholipids), macrophages tend to absorb these cochleate particles very well.

Oral Formulation: Many drugs that are currently on the market are only effective in treating diseases when administered via IV. For example, many anti-infective drugs must be administered via IV in order to be effective. IV administration presents several challenges to care, such as risk of infection, patient discomfort from injections, and higher cost of care than anti-infective drugs that can be taken orally (IV delivery must be performed by a doctor or nurse, often within a very expensive hospital setting). Although several technologies have been used to attempt to convert IV drugs to orally delivered medications, success has been limited due to the difficulty in achieving adequate bioavailability (i.e., the amount of drug that is absorbed into the body) with oral formulation. We believe that the unique cochleate crystal-structure in our platform technology protects the drug from degradation when it passes through the gastrointestinal (GI) tract and that its lipid surface features facilitate the particle to be absorbed into the blood stream. The potential application of our cochleate delivery technology for the delivery of injectable medications offers significant clinical and commercial value if successfully demonstrated in human clinical trials.

Our cochleate lipid-crystal nano-particle technology changes the delivery of medicines in a unique manner and alters the bio-distribution of these medications by targeting tissues and organs that are affected by infection and inflammation. Besides IV-only anti-infectives such as amphotericin B and amikacin, we have orally delivered in animal studies the influenza vaccine, siRNA, NSAIDs, other anti-infectives such as atovaquone, and many other compounds across multiple therapeutic areas, demonstrating the potential broad application of our technology. We have observed rapid local accumulation in infected tissues, which appear to be the result of transport of our drug-loaded cochleates by macrophages and other immune-cells. For example, in a mouse model of invasive candidiasis, comparing orally administered MAT2203 to injected amphotericin B deoxycholate (original drug Fungizone), we observed amphotericin B levels above the minimal inhibitory concentration inside infected organs on day 1 with MAT2203 treatment while such levels were not reached with the injected original amphotericin-deoxycholate product until 3-4 days of treatment. Such kinetics have been seen before with other medications, such as macrolide antibiotics (e.g. azithromycin). It appears from our data that the kinetics of cochleate delivery has similarities to the kinetics of macrolide antibiotics. We expect that additional pre-clinical and clinical work on the kinetics of our cochleate products will further elucidate the mechanism of cochleate delivery to the site of infection or inflammation.

Historical Development of Cochleate Delivery Technology

The cochleate delivery technology was originally developed by the University of Medicine and Dentistry of New Jersey and Albany Medical College in collaboration with BioDelivery Sciences, Inc., a company founded in 1995 by Dr. Raphael Mannino, who joined our Scientific Advisory Board in connection with the Aquarius acquisition, and Dr. Susan Gould-Fogerite, and others. BioDelivery Sciences International, Inc. (NASDAQ: BDSI) acquired BioDelivery Sciences, Inc. in 2002 and Dr. Mannino and Dr. Gould-Fogerite joined BDSI's management team. BDSI continued the development of the cochleate delivery technology pursuant to an exclusive license with the University of Medicine and Dentistry of New Jersey and Albany Medical College and application of such drug delivery technology to an array of established pharmaceuticals, including an application of cochleate delivery technology to a broad spectrum anti-fungal drug called amphotericin B, which has developed into our MAT 2203 product candidate. BDSI filed an IND for this product at the end of 2006, performed several animal toxicology studies and performed a single dose Phase 1 study. In the animal studies conducted by BDSI, doses used in toxicology studies were shown to produce measureable tissue concentrations and efficacy against the fungal infections candidiasis and aspergillosis. In 2009, BDSI reported preliminary results from its Phase 1 study in humans, where BDSI indicated that plasma concentrations of amphotericin B were detected in the sample of patients tested suggesting oral absorption from the cochleate delivery system. Forty-eight healthy volunteers participated in the study, with sixteen recruited for each of three dose groups. In each dose group, twelve volunteers received a single dose of cochleate amphotericin B (MAT 2203) and four received a placebo. Amphotericin B plasma concentrations were measured over a period of fourteen days. The study identified doses that were well-tolerated with no meaningful changes in laboratory safety values including those associated with renal function. The preliminary pharmacokinetic evaluation, available in February 2009, revealed that plasma concentrations were comparable to those seen in prior animal toxicology studies using the same formulation. In previous animal studies conducted by BDSI in collaboration with PHRI, a microbiological research institute associated with Rutgers University, doses used in such studies were shown to produce measureable tissue concentrations and efficacy against the fungal infections candidiasis and aspergillosis. In 2009, BDSI focused its resources on its BEMA opioid delivery technology and the rights to the cochleated technology reverted back to Rutgers University. In 2012, Rutgers University spun out the cochleate technology into a new company named Aquarius Biotechnologies Inc., which we subsequently acquired in 2015.

Additional Pipeline Opportunities

We believe our cochleate delivery technology can be used to reformulate a wide variety of drugs which are currently only available in IV formulations. Leveraging our cochleate delivery technology, we believe we can develop a robust pipeline of product candidates. We have tested a range of pharmaceutical compounds reformulated by our cochleate delivery technology in proof-of-concept animal studies, including vaccines, anti-inflammatory agents, oligonucleotides and atovaquone. By way of example, we recently received a patent issuance related to cochleate compositions directed against expressions of proteins. The allowed patent claims cover our proprietary methods related to the composition and the formation of encochleated siRNA for potential use as therapy for regulating gene expression. We intend to pursue opportunities to develop products, either alone or in partnership with other pharmaceutical or biotech companies, related to this technology.

Exclusive License Agreement with Rutgers University

Through our acquisition of Aquarius, we acquired a license from Rutgers University for the cochleate delivery technology. The Amended and Restated Exclusive License Agreement between Aquarius and Rutgers, The State University of New Jersey (successor in interest to the University of Medicine and Dentistry of New Jersey) provides for, among other things, (1) a license issue fee of \$25,000 paid upon execution, (2) an increased equity interest in the company from 5% to 7.5% of Aquarius (prior to our acquisition of Aquarius in the Aquarius Merger), (3) royalties on a tiered basis between low single digits and the mid-single digits of net sales of products using such licensed technology, (4) a one-time sales milestone fee of \$100,000 when and if sales of products using the licensed technology reach the specified sales threshold and (5) an annual license fee of initially \$10,000, increasing to \$50,000 over the term of the license agreement. We also agreed to assume the responsibility to pay required patent prosecution and maintenance fees covering the technology.

Unless otherwise terminated by either party, the term of the license, on a country by country basis, shall be the longer of 7-1/2 years from the date of first commercial sale of a product in a country using the licensed technology or until the expiration of the last-to-expire patent rights licensed under the agreement, whichever is longer. Rutgers has the right to terminate the license agreement if we have not commenced commercial sales of at least one product using the licensed technology within nine years of the effective date of the license agreement.

Intellectual Property

The proprietary nature of, and protection for, our product candidates and our discovery programs, processes and know-how are important to our business. We will seek to protect our products and associated technologies for their manufacturing and development through a combination of patents, trade secrets, proprietary know-how, FDA exclusivity and contractual restrictions on disclosure. Our policy is to pursue, maintain and defend patent rights and to protect the technology, inventions and improvements that are commercially important to the development of our business. Our success will significantly depend on our ability to obtain and maintain patent and other proprietary protection for commercially important technology and inventions and know-how related to our business, defend and enforce our patents, preserve the confidentiality of our trade secrets and operate without infringing the valid and enforceable patents and proprietary rights of third parties. We also rely heavily on know-how and continuing technological innovation to develop and maintain our proprietary position.

Exclusively Licensed Intellectual Property Relating to Our Proprietary Cochleate Delivery Technology Platform and MAT2203 and MAT2501

The patents and patent applications that we exclusively license from Rutgers University provide patent protection for the proprietary chemistry technology used in our process to make cochleates and formulate the active pharmaceutical ingredients delivered inside this delivery technology, as in MAT2203 and MAT2501. Pursuant to our license agreement, we have acquired rights to a portfolio of 19 issued and foreign patents, including 11 patents issued within the last 3 years, which extends patent protection until at least 2033. In addition, we have more than 20 pending patent applications filed both in the United States and in foreign jurisdictions, including 16 national phase applications filed within the past 2 years. We have chosen to file these patent applications in selected foreign markets that we consider important for our product candidates. These international markets generally include Europe, China, India, Brazil, Russia, Canada, Japan, Korea, Australia and Mexico. These pending patent applications can extend patent protection through at least 2033. The patent portfolio covering our cochleate delivery system covers a broad spectrum of technology, including amphotericin B cochleates, geodate cochleates, methods of delivering nutrients or biologically relevant molecules to a host using cochleates, cochleate vaccine compositions and protein-lipid vesicles, small interfering RNA cochleates, methods of enhancing the encochleation of hydrophilic molecules and cochleates made with low purity soy phosphatidylserine.

We cannot be sure that patents will be granted with respect to any of our pending patent applications or with respect to any patent applications we may own or license in the future, nor can we be sure that any of our existing patents or any patents we may own or license in the future will be useful in protecting our technology. For this and more comprehensive risks related to our intellectual property, please see “Risk Factors—Risks Relating to Our Intellectual Property.”

In addition to patents, we rely on trade secrets and know-how to develop and maintain our competitive position. For example, significant aspects of our proprietary technology platform are based on unpatented trade secrets and know-how. Trade secrets and know-how can be difficult to protect. We seek to protect our proprietary technology and processes, in part, by confidentiality agreements and invention assignment agreements with our employees, consultants, scientific advisors, contractors and commercial partners. These agreements are designed to protect our proprietary information and, in the case of the invention assignment agreements, to grant us ownership of technologies that are developed through a relationship with a third party. We also seek to preserve the integrity and confidentiality of our data and trade secrets by maintaining physical security of our premises and physical and electronic security of our information technology systems. While we have confidence in these individuals, organizations and systems, agreements or security measures may be breached, and we may not have adequate remedies for any breach. In addition, our trade secrets may otherwise become known or be independently discovered by competitors. To the extent that our contractors use intellectual property owned by others in their work for us, disputes may arise as to the rights in related or resulting know-how and inventions.

We also plan to seek trademark protection in the United States and outside of the United States where available and when appropriate. We intend to use these registered marks in connection with our pharmaceutical research and development as well as our product candidates.

Competition

The biotechnology and pharmaceutical industries are characterized by rapidly advancing technologies, intense competition and a strong emphasis on proprietary products. We face competition from many different sources, including commercial pharmaceutical and biotechnology enterprises, academic institutions, government agencies and private and public research institutions. Many of these companies have far greater human and financial resources and may have product candidates in more advanced stages of development and many will reach the market before our product candidates. Competitors may also develop products that are more effective, safer or less expensive or that have better tolerability or convenience. Although we believe that our formulation delivery technology, experience and knowledge in our areas of focus provide us with competitive advantages, these potential competitors could reduce our commercial opportunities. For many of our product candidates, we anticipate facing competition from other products that are available on a generic basis and offered at low prices. Many of these generic products have been marketed by third parties for many years and are well accepted by physicians, patients and payers.

We believe that MAT2203, MAT2501 and any other development candidate we may pursue in the future using our proprietary lipid-crystal nanoparticle drug delivery platform technology, paralleled with our scientific and development expertise in the field of drug delivery, provide us with competitive advantages over our peers. However, we face potential competition from various sources, including larger and better-funded pharmaceutical, specialty pharmaceutical, and biotechnology companies, as well as from generic drug manufacturers, academic institutions, governmental agencies and public and private research institutions.

MAT2203 will primarily compete with antifungal classes approved for the treatment of candidemia and mold infections, which include polyenes, azoles and echinocandins. The approved branded therapies for these indications include Cancidas (caspofungin, marketed by Merck & Co.), Eraxis (anidulafungin, marketed by Pfizer, Inc.), Mycamine (micafungin, marketed by Astellas Pharma US, Inc.), Diflucan (fluconazole, marketed by Pfizer, Inc.), Noxafil (posaconazole, marketed by Merck & Co.), Vfend (voriconazole, marketed by Pfizer, Inc.), Sporanox (itraconazole, marketed by Jansen Pharmaceuticals, Inc.), Cresemba (isavuconazole, marketed by Astellas Pharma US, Inc.), Ambisome (liposomal amphotericin B, marketed by Astellas Pharma US, Inc.) Abelcet (lipid complex amphotericin B, marketed by Sigma Tau Pharmaceuticals Inc.) and amphotericin B deoxycholate (marketed by X-Gen Pharmaceuticals, Inc.). There currently are and may be more generic versions of these products available at the time of MAT2203 market approval, which will create added competition. In addition to approved therapies, we expect that MAT2203 may compete with product candidates that we are aware of in clinical development by third parties, such as SCY-078 (being developed by Scynexis, Inc.), CD101 IV (being developed by Cidara Therapeutics, Inc.) and certain products being developed by Viamet Pharmaceuticals Holdings, LLC, and F2G, Ltd.

MAT2501 will compete with a number of drugs currently in development, including Arikayce®, an inhaled version of amikacin being developed by Insmid Incorporated for the treatment of NTM; plazomycin, which is being developed by Achaogen, Inc; eravacycline, which is being developed by Tetrphase Pharmaceuticals, Inc.; Brilacidin®, being developed as a broad spectrum anti-bacterial by Cellceutix Corporation, and Raptor Pharmaceuticals, Inc., which has recently announced it intends to pursue development of an inhaled version of the antibiotic levofloxacin for the treatment of NTM.

Manufacturing

We currently lease and operate in-house manufacturing capabilities for our product candidates, including MAT2203 and MAT2501. While sufficient to produce the clinical supplies of product necessary to conduct our ongoing clinical trials and potentially early commercialization of these products, we will need to expand our internal manufacturing capabilities in the future. If we are not able to retain our current manufacturing facilities and if we do not develop additional in-house manufacturing capability for cochleates needed for our MAT2203 and MAT2501 product candidates sufficient to produce product for commercialization of these products, we will need to develop relationships with third-party manufacturers for the manufacture of our product candidates which is likely to be time consuming and expensive.

There are a number of potential third party suppliers for amphotericin B and amikacin, the generic active pharmaceutical ingredients in our lead clinical stage product candidates – MAT2203 and MAT2501, respectively. Although to date we have not entered into formal supply agreements to secure sufficient supply of amphotericin B and amikacin to support our clinical programs for MAT2203 and MAT2501, we believe we will be able to secure supply of amphotericin B and amikacin to support our clinical programs for MAT2203 and MAT2501 from one or more third-party suppliers. As we move through development for each of our product candidates, we expect to enter into long term supply arrangements for these key active pharmaceutical ingredients.

Sales and Marketing

We currently do not have any sales and marketing infrastructure. We plan to retain U.S. marketing and sales rights or co-promotion rights for our product candidates for which we receive marketing approvals, particularly in situations where it is possible to access the market through a focused, specialized sales force. For situations in which a large sales force is required to access the market, and with respect to markets outside the United States, we generally plan to commercialize our product candidates through collaborative arrangements with leading pharmaceutical and biotechnology companies.

Review and Approval of Drugs in the United States

In the United States, FDA regulates drugs under the Federal Food, Drug, and Cosmetic Act, or FDCA, and implementing regulations. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local and foreign statutes and regulations requires the expenditure of substantial time and financial resources. Failure to comply with the applicable U.S. requirements at any time during the product development process, approval process or after approval may subject an applicant and/or sponsor to a variety of administrative or judicial sanctions, including refusal by FDA to approve pending applications, withdrawal of an approval, imposition of a clinical hold, issuance of warning letters and other types of letters, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, refusals of government contracts, restitution, disgorgement of profits, or civil or criminal investigations and penalties brought by FDA and the Department of Justice, or DOJ, or other governmental entities.

Our product candidates must be approved by FDA through the new drug application, or NDA, or biologics license application, or BLA, in the case of biologic product candidates, process before they may be legally marketed in the United States. An applicant seeking approval to market and distribute a new drug product in the United States must typically undertake the following:

- completion of nonclinical laboratory tests, animal studies and formulation studies in compliance with FDA's good laboratory practice, or cGLP, regulations;
- submission to FDA of an IND, which must take effect before human clinical trials may begin;
- approval by an independent institutional review board, or IRB, representing each clinical site before each clinical trial may be initiated;
- performance of adequate and well-controlled human clinical trials in accordance with current good clinical practices, or GCP, to establish the safety and efficacy of the proposed drug product for each indication;
- preparation and submission to FDA of an NDA or BLA;
- review of the product by an FDA advisory committee, where appropriate or if applicable;
- satisfactory completion of one or more FDA inspections of the manufacturing facility or facilities at which the product, or components thereof, are produced to assess compliance with current Good Manufacturing Practices, or cGMP, requirements and to assure that the facilities, methods and controls are adequate to preserve the product's identity, strength, quality and purity;
- payment of user fees and securing FDA approval of the NDA or BLA; and
- compliance with any post-approval requirements, including a risk evaluation and mitigation strategy, or REMS, and post-approval studies required by FDA.

Nonclinical Studies

Nonclinical studies include laboratory evaluation of the purity and stability of the manufactured drug substance or active pharmaceutical ingredient and the formulated drug or drug product, as well as *in vitro* and animal studies to assess the safety and activity of the drug for initial testing in humans and to establish a rationale for therapeutic use. The conduct of nonclinical studies is subject to federal regulations and requirements, including cGLP regulations. The results of the nonclinical tests, together with manufacturing information, analytical data, any available clinical data or literature and plans for clinical trials, among other things, are submitted to FDA as part of an IND.

Companies usually must complete some long-term nonclinical testing, such as animal tests of reproductive adverse events and carcinogenicity, and must also develop additional information about the chemistry and physical characteristics of the drug and finalize a process for manufacturing the drug in commercial quantities in accordance with cGMP requirements. The manufacturing process must be capable of consistently producing quality batches of the drug candidate and, among other things, the manufacturer must develop methods for testing the identity, strength, quality and purity of the final drug product. Additionally, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the drug candidate does not undergo unacceptable deterioration over its shelf life.

Human Clinical Trials in Support of a Regulatory Approval

Clinical trials involve the administration of the investigational product to human subjects under the supervision of qualified investigators in accordance with GCP requirements, which include, among other things, the requirement that all research subjects provide their informed consent in writing before their participation in any clinical trial. Clinical trials are conducted under written study protocols detailing, among other things, the objectives of the study, the parameters to be used in monitoring safety and the effectiveness criteria to be evaluated. A protocol for each clinical trial and any subsequent protocol amendments must be submitted to FDA as part of the IND. An IND automatically becomes effective 30 days after receipt by FDA, unless before that time FDA raises concerns or questions related to a proposed clinical trial and places the trial on clinical hold. In such a case, the IND sponsor and FDA must resolve any outstanding concerns before the clinical trial can begin. Accordingly, submission of an IND may or may not result in FDA allowing clinical trials to commence.

In addition, an IRB representing each institution participating in the clinical trial must review and approve the plan for any clinical trial before it commences at that institution, and the IRB must conduct continuing review and reapprove the study at least annually. The IRB must review and approve, among other things, the study protocol and informed consent information to be provided to study subjects. An IRB must operate in compliance with FDA regulations. Information about certain clinical trials must be submitted within specific timeframes to the National Institutes of Health for public dissemination on their ClinicalTrials.gov website.

A sponsor who wishes to conduct a clinical trial outside the United States may, but need not, obtain FDA authorization to conduct the clinical trial under an IND. When a foreign clinical study is conducted under an IND, all FDA IND requirements must be met unless waived. If a foreign clinical trial is not conducted under an IND, the sponsor may submit data from the clinical trial to FDA in support of an NDA or IND so long as the clinical trial is conducted in accordance with GCP and if FDA is able to validate the data from the clinical trial through an on-site inspection, if FDA deems it necessary.

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

Phase 1: The drug is initially introduced into a small number of healthy human subjects or patients with the target disease (e.g. cancer) or condition and tested for safety, dosage tolerance, absorption, metabolism, distribution, excretion and, if possible, to gain an early indication of its effectiveness and to determine optimal dosage.

Phase 2: The drug is administered to larger number of trial participants, may be up to several hundred, who usually have the disease or condition that the experimental drug is intended to treat, to identify possible adverse effects and safety risks, to preliminarily evaluate the efficacy of the product for specific targeted diseases and to determine dosage tolerance and optimal dosage.

Phase 3: These clinical trials are commonly referred to as “pivotal” studies, which typically denotes a study which presents the data that FDA or other relevant regulatory agency will use to determine whether or not to approve a drug. In Phase 3 clinical trials, the drug is administered to an expanded patient population, generally at geographically dispersed clinical trial sites, in well-controlled clinical trials to generate enough data to statistically evaluate the efficacy and safety of the product for approval, to establish the overall risk-benefit profile of the product, and to provide adequate information for the labeling of the product.

Progress reports detailing the results of the clinical trials must be submitted at least annually to FDA and more frequently if serious adverse events occur. Phase 1, Phase 2 and Phase 3 clinical trials may not be completed successfully within any specified period, or at all. Furthermore, FDA or the sponsor may suspend or terminate a clinical trial at any time on various grounds, including a finding that the research subjects are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution, or an institution it represents, if the clinical trial is not being conducted in accordance with the IRB’s requirements or if the drug has been associated with unexpected serious harm to patients. FDA will typically inspect one or more clinical sites to assure compliance with GCP and the integrity of the clinical data submitted.

Submission of an NDA to FDA

Regulatory approval for most new drug or biologic products is based on two adequate and well-controlled Phase 3 clinical trials that provide evidence of the safety and efficacy of the proposed new product. Assuming successful completion of required clinical testing and other requirements, the results of the nonclinical and clinical trials, together with detailed information relating to the product's chemistry, manufacture, controls and proposed labeling, among other things, are submitted to FDA as part of an NDA requesting approval to market the drug product for one or more indications. Under federal law, the submission of most NDAs is additionally subject to an application user fee, currently exceeding \$2.0 million, and the sponsor of an approved NDA is also subject to annual product and establishment user fees, currently exceeding \$97,750 per product and \$512,200 per establishment. These fees are typically increased annually.

FDA conducts a preliminary review of an NDA within 60 days of its receipt and informs the sponsor by the 74th day after FDA's receipt of the submission whether the application is sufficiently complete to permit substantive review. FDA may request additional information rather than accept an NDA for filing. In this event, the application must be resubmitted with the additional information. The resubmitted application is also subject to review before FDA accepts it for filing. Once the submission is accepted for filing, FDA begins an in-depth substantive review. FDA has agreed to specified performance goals in the review process of NDAs. Most such applications are meant to be reviewed within ten months from the date of filing, and most applications for "priority review" products are meant to be reviewed within six months of filing. The review process may be extended by FDA for various reasons, and for various time periods, including for three additional months to consider new information or clarification provided by the applicant to address an outstanding deficiency identified by FDA following the original submission.

Before approving an NDA, FDA typically will inspect the facility or facilities where the product is or will be manufactured. These pre-approval inspections cover all facilities associated with an NDA submission, including drug component manufacturing (such as Active Pharmaceutical Ingredients), finished drug product manufacturing and control testing laboratories. FDA will not approve an application unless it determines that the manufacturing processes and facilities are in compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications. Additionally, before approving an NDA, FDA will typically inspect one or more clinical sites to assure compliance with GCP.

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

Fast Track, Breakthrough Therapy and Priority Review Designations

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

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

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

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

Under Section 524 of the FDCA, FDA is authorized to award a priority review voucher to sponsors of certain tropical disease product applications that meet the criteria specified in the Act. A priority review voucher may be used by the sponsor who obtains it or it may be transferred to another sponsor who may use it to obtain priority review for a different application. Priority review vouchers can result in the acceleration of review and approval of a product candidate by up to four months. In order to be eligible for a tropical disease priority review voucher, the application must be: for a listed tropical disease; submitted under Section 505(b)(1) of the FDCA or Section 351 of the Public Health Service Act after September 27, 2007; for a product that contains no active ingredient that has been approved in any other application under those statutory provisions; and must qualify for priority review. FDA has identified in guidance those product applications for the prevention or treatment of tropical diseases that may qualify for a priority review voucher.

Accelerated Approval Pathway

FDA may grant accelerated approval to a drug for a serious or life-threatening condition that provides meaningful therapeutic advantage to patients over existing treatments based upon a determination that the drug has an effect on a surrogate endpoint that is reasonably likely to predict clinical benefit. FDA may also grant accelerated approval for such a condition when the product has an effect on an intermediate clinical endpoint that can be measured earlier than an effect on irreversible morbidity or mortality, or IMM, and that is reasonably likely to predict an effect on irreversible morbidity or mortality or other clinical benefit, taking into account the severity, rarity, or prevalence of the condition and the availability or lack of alternative treatments. Drugs granted accelerated approval must meet the same statutory standards for safety and effectiveness as those granted traditional approval.

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

The accelerated approval pathway is most often used in settings in which the course of a disease is long and an extended period of time is required to measure the intended clinical benefit of a drug, even if the effect on the surrogate or intermediate clinical endpoint occurs rapidly. The accelerated approval pathway is usually contingent on a sponsor's agreement to conduct, in a diligent manner, additional post-approval confirmatory studies to verify and describe the drug's clinical benefit. As a result, a product candidate approved on this basis is subject to rigorous post-marketing compliance requirements, including the completion of Phase 4 or post-approval clinical trials to confirm the effect on the clinical endpoint. Failure to conduct required post-approval studies, or confirm a clinical benefit during post-marketing studies, would allow FDA to withdraw the drug from the market on an expedited basis. All promotional materials for product candidates approved under accelerated regulations are subject to prior review by FDA.

FDA's Decision on an NDA

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

If FDA approves a product, it may limit the approved indications for use for the product, require that contraindications, warnings or precautions be included in the product labeling, require that post-approval studies, including Phase 4 clinical trials, be conducted to further assess the drug's safety after approval, require testing and surveillance programs to monitor the product after commercialization, or impose other conditions which can materially affect the potential market and profitability of the product. In addition, as a condition of approval, FDA may require an applicant to develop a REMS. REMS use risk minimization strategies beyond the professional labeling to ensure that the benefits of the product outweigh the potential risks. To determine whether a REMS is needed, FDA will consider the size of the population likely to use the product, seriousness of the disease, expected benefit of the product, expected duration of treatment, seriousness of known or potential adverse events and whether the product is a new molecular entity. REMS can include medication guides, physician communication plans for healthcare professionals and elements to assure safe use, which may include, but are not limited to, special training or certification for prescribing or dispensing, dispensing only under certain circumstances, special monitoring and the use of patient registries. FDA may require a REMS before approval or post-approval if it becomes aware of a serious risk associated with use of the product. The requirement for a REMS can materially affect the potential market and profitability of a product.

FDA may prevent or limit further marketing of a product based on the results of post-market studies or surveillance programs. After approval, many types of changes to the approved product, such as adding new indications, manufacturing changes and additional labeling claims, are subject to further testing requirements and FDA review and approval.

Post-Approval Requirements

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

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

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

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

FDA strictly regulates marketing, labeling, advertising and promotion of products that are placed on the market. Drugs may be promoted only for the approved indications and in accordance with the provisions of the approved label. FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses, and a company that is found to have improperly promoted off-label uses may be subject to significant liability.

In addition, the distribution of prescription pharmaceutical products is subject to the Prescription Drug Marketing Act, or PDMA, which regulates the distribution of drugs and drug samples at the federal level, and sets minimum standards for the registration and regulation of drug distributors by the states. Both the PDMA and state laws limit the distribution of prescription pharmaceutical product samples and impose requirements to ensure accountability in distribution.

Abbreviated New Drug Applications for Generic Drugs

In 1984, with passage of the Hatch-Waxman Amendments to the FDCA, Congress authorized FDA to approve generic drugs that are the same as drugs previously approved by FDA under the NDA provisions of the statute. To obtain approval of a generic drug, an applicant must submit an abbreviated new drug application, or ANDA, to the agency. In support of such applications, a generic manufacturer may rely on the nonclinical and clinical testing previously conducted for a drug product previously approved under an NDA, known as the reference listed drug, or RLD.

Specifically, in order for an ANDA to be approved, FDA must find that the generic version is identical to the RLD with respect to the active ingredients, the route of administration, the dosage form and the strength of the drug. At the same time, FDA must also determine that the generic drug is “bioequivalent” to the innovator drug. Under the statute, a generic drug is bioequivalent to a RLD if the rate and extent of absorption of the drug do not show a significant difference from the rate and extent of absorption of the listed drug.

Upon approval of an ANDA, FDA indicates whether the generic product is therapeutically equivalent to the RLD in its publication “Approved Drug Products with Therapeutic Equivalence Evaluations,” also referred to as the “Orange Book.” Physicians and pharmacists consider a therapeutically equivalent generic drug to be fully substitutable for the RLD. In addition, by operation of certain state laws and numerous health insurance programs, FDA’s designation of therapeutic equivalence often results in automatic substitution of the generic drug by the pharmacist without the knowledge or consent of either the prescribing physician or patient.

Under the Hatch-Waxman Amendments, FDA may not approve an ANDA until any applicable period of non-patent exclusivity for the RLD has expired. The FDCA provides a period of five years of non-patent data exclusivity for a new drug containing a new chemical entity. In cases where such exclusivity has been granted, an ANDA may not be submitted to FDA until the expiration of five years unless the submission is accompanied by a Paragraph IV certification, in which case the applicant may submit its application four years following the original product approval. The FDCA also provides for a period of three years of exclusivity if the NDA includes reports of one or more new clinical investigations, other than bioavailability or bioequivalence studies, that were conducted by or for the applicant and are essential to the approval of the application. This three-year exclusivity period often protects changes to a previously approved drug product, such as a new dosage form, route of administration, combination or indication.

Hatch-Waxman Patent Certification and the 30 Month Stay

Upon approval of an NDA or a supplement thereto, NDA sponsors are required to list with FDA each patent with claims that cover the applicant's product or an approved method of using the product. Each of the patents listed by the NDA sponsor is published in the Orange Book. When an ANDA applicant submits its application to FDA, the applicant is required to certify to FDA concerning any patents listed for the reference product in the Orange Book, except for patents covering methods of use for which the ANDA applicant is not seeking approval. Specifically, the applicant must certify with respect to each patent that:

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

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

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

Pediatric Studies and Exclusivity

Under the Pediatric Research Equity Act of 2003, an NDA or supplement thereto must contain data that are adequate to assess the safety and effectiveness of the drug product for the claimed indications in all relevant pediatric subpopulations, and to support dosing and administration for each pediatric subpopulation for which the product is safe and effective. With enactment of the Food and Drug Administration Safety and Innovation Act, or FDASIA, in 2012, sponsors must also submit pediatric study plans prior to the assessment data. Those plans must contain an outline of the proposed pediatric study or studies the applicant plans to conduct, including study objectives and design, any deferral or waiver requests, and other information required by regulation. The applicant, FDA and FDA's internal review committee must then review the information submitted, consult with each other, and agree upon a final plan. FDA or the applicant may request an amendment to the plan at any time.

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

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

Orphan Designation and Exclusivity

Under the Orphan Drug Act, FDA may designate a drug product as an “orphan drug” if it is intended to treat a rare disease or condition (generally meaning that it affects fewer than 200,000 individuals in the United States, or more in cases in which there is no reasonable expectation that the cost of developing and making a drug product available in the United States for treatment of the disease or condition will be recovered from sales of the product). A company must request orphan product designation before submitting a NDA. If the request is granted, FDA will disclose the identity of the therapeutic agent and its potential use. Orphan product designation does not convey any advantage in, or shorten the duration of, the regulatory review and approval process.

If a product with orphan status receives the first FDA approval for the disease or condition for which it has such designation, the product will be entitled to orphan product exclusivity. Orphan product exclusivity means that FDA may not approve any other applications for the same product for the same indication for seven years, except in certain limited circumstances. Competitors may receive approval of different products for the indication for which the orphan product has exclusivity and may obtain approval for the same product but for a different indication. If a drug or drug product designated as an orphan product ultimately receives marketing approval for an indication broader than what was designated in its orphan product application, it may not be entitled to exclusivity.

21st Century Cures Act

On December 13, 2016, Congress passed the 21st Century Cures Act, or the Cures Act. The Cures Act is designed to modernize and personalize healthcare, spur innovation and research, and streamline the discovery and development of new therapies through increased federal funding of particular programs. It authorizes increased funding for FDA to spend on innovation projects. The new law also amends the Public Health Service Act to reauthorize and expand funding for the National Institutes of Health. The Act establishes the NIH Innovation Fund to pay for the cost of development and implementation of a strategic plan, early stage investigators and research. It also charges NIH with leading and coordinating expanded pediatric research. In addition, the Cures Act includes provisions requiring FDA to assess and publish guidance on the use of novel clinical trial designs, the use of real world evidence in applications, the availability of summary level review for supplemental applications for certain indications, and the qualification of drug development tools. Because the Cures Act has only recently been enacted, its potential effect on our business remains unclear with the exception of a provision requiring that we post our policies on the availability of expanded access programs for individuals. Because these provisions allow FDA to spend several years developing these policies, the effect on us could be delayed.

With amendments to the FDCA and the Public Health Service Act, or PHS Act, Title III of the Cures Act seeks to accelerate the discovery, development, and delivery of new medicines and medical technologies. To that end, and among other provisions, the Cures Act reauthorizes the existing priority review voucher program for certain drugs intended to treat rare pediatric diseases until 2020; creates a new priority review voucher program for drug applications determined to be material national security threat medical countermeasure applications; and revises the FDCA to streamline review of combination product applications.

Section 3042 of the Cures Act authorizes a new “Limited Population Pathway” to expedite approval of antimicrobial products intended to treat serious or life-threatening infections for which there are unmet medical needs. Drugs approved under this provision would be required to adhere to special labeling requirements, including a prominent “Limited Population” statement. Additionally, in recognition of increasing concerns about drug-resistant infections, the Act requires the U.S. Government Accountability Office (GAO) to compile a report on antimicrobial resistance by 2021, which would include a review of any effect of the new Limited Population Pathway on antibacterial or antifungal resistance. We will monitor these developments but cannot currently assess how this initiative may impact our business.

Other Health Care Regulations

Health Privacy Laws

We are subject to data protection laws and regulations (i.e., laws and regulations that address privacy and data security). In the U.S., numerous federal and state laws and regulations, including state data breach notification laws, state health information privacy laws, and federal and state consumer protection laws (e.g., Section 5 of the FTC Act), govern the collection, use, disclosure, and protection of health-related and other personal information. Failure to comply with data protection laws and regulations could result in government enforcement actions and create liability for us (which could include civil and/or criminal penalties), private litigation and/or adverse publicity that could negatively affect our operating results and business. In addition, we may obtain health information from third parties (e.g., principal investigators involved in our clinical trials)) that are subject to privacy and security requirements under the Health Insurance Portability and Accountability Act of 1996, as amended by the Health Information Technology for Economic and Clinical Health Act, or HITECH, (“HIPAA”). HIPAA generally requires that covered entities (healthcare providers, health plans and healthcare clearinghouses) obtain written authorizations from patients prior to disclosing protected health information of the patient (unless an exception to the authorization requirement applies). If authorization is required and the patient fails to execute an authorization or the authorization fails to contain all required provisions, then we may not be allowed access to and use of the patient's information and our research efforts could be impaired or delayed. Furthermore, use of protected health information that is provided to us pursuant to a valid patient authorization is subject to the limits set forth in the authorization (e.g., for use in research and in submissions to regulatory authorities for product approvals). Among other things, HITECH makes HIPAA's privacy and security standards, as well as the various penalties or failure to comply, directly applicable to “business associates”—independent contractors or agents of covered entities performing certain functions involving the creation or use of protected health information on behalf of a covered entity, or providing services to a covered entity. While we do not believe we are a “business associate” under HIPAA, regulatory agencies may disagree.

The collection and use of personal health data in the European Union, presently governed by the provisions of the European Data Protection Directive (95/46/EC), or the EU Directive, as implemented by the European Member States, will be replaced with the General Data Protection Regulation, or GDPR. Currently, the EU Directive establishes a regulatory framework designed to protect the security of personal data collected about residents of the EU and the movement of such personal data across the national borders of the EU Member States. The EU Directive would apply to clinical trial data we may collect about residents of the European Union. GDPR was adopted in 2016 and will become enforceable in the European Union Member States in May 2018. The GDPR will impose many new or additional requirements including, but not limited to, obtaining consent of the individuals to whom the personal data relates, the nature and scope of notifications provided to the individuals, the security and confidentiality of the personal data, data breach notification and using third party processors in connection with the processing of the personal data. Failure to comply with the EU Directive and the GDPR, when effective, could subject us to regulatory sanctions, delays in clinical trials, criminal prosecution and/or civil fines or penalties. Additionally, GDPR creates a direct cause of action by individual data subjects. To comply with the new data protection rules imposed by the GDPR we may be required to use additional human and financial resources to come into and maintain compliance.

Fraud and Abuse Laws

In addition to FDA restrictions on marketing of pharmaceutical products, several other types of state and federal laws have been applied to restrict certain marketing practices in the pharmaceutical industry in recent years. These laws include anti-kickback statutes and false claims statutes. The federal healthcare program anti-kickback statute prohibits, among other things, knowingly and willfully offering, paying, soliciting or receiving remuneration to induce or in return for purchasing, leasing, ordering or arranging for the purchase, lease or order of any healthcare item or service reimbursable under Medicare, Medicaid or other federally financed healthcare programs. This statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on the one hand and prescribers, purchasers and formulary managers on the other. Violations of the anti-kickback statute are punishable by imprisonment, criminal prosecution, civil monetary penalties and exclusion from participation in federal healthcare programs. Although there are a number of statutory exemptions and regulatory safe harbors protecting certain common activities from prosecution or other regulatory sanctions, the exemptions and safe harbors are drawn narrowly, and practices that involve remuneration intended to induce prescribing, purchases or recommendations may be subject to scrutiny if they do not qualify for an exemption or safe harbor.

Federal false claims laws prohibit any person from knowingly presenting, or causing to be presented, a false claim for payment to the federal government, or knowingly making, or causing to be made, a false statement to have a false claim paid. Recently, several pharmaceutical and other healthcare companies have been prosecuted under these laws for allegedly inflating drug prices they report to pricing services, which in turn were used by the government to set Medicare and Medicaid reimbursement rates, and for allegedly providing free product to customers with the expectation that the customers would bill federal programs for the product. In addition, certain marketing practices, including off-label promotion, may also violate false claims laws. The majority of states also have statutes or regulations similar to the federal anti-kickback statute and false claims laws, which apply to items and services reimbursed under Medicaid and other state programs, or, in several states, apply regardless of the payor.

Affordable Care Act

In late March 2010, the Federal government enacted the comprehensive health care reform package, the Affordable Care Act (ACA). Among other provisions, the ACA imposes individual and employer health insurance requirements, provides certain insurance subsidies (e.g., premiums and cost sharing), mandates extensive insurance market reforms, creates new health insurance access points (e.g., State and federal-based health insurance exchanges), expands the Medicaid program, promotes research on comparative clinical effectiveness of different technologies and procedures, and makes a number of changes to how products and services will be reimbursed by the Medicare program. Amendments to the Federal False Claims Act under the ACA have made it easier for private parties to bring “qui tam” (whistleblower) lawsuits against companies, under which the whistleblower may be entitled to receive a percentage of any money paid to the government.

The ACA remains subject to legislative efforts to repeal, modify or delay the implementation of the law. Efforts to date have generally been unsuccessful as a result of the balance of power in Congress and the President’s veto power. However, the recent Presidential and Congressional elections, which resulted in the election of the Republican presidential nominee and Republican majorities in both houses of Congress, may result in additional efforts to repeal, modify or delay implementation of the ACA. If the ACA is repealed or modified, or if implementation of certain aspects of the ACA are delayed, such repeal, modification or delay may materially adversely impact our business, strategies, prospects, operating results or financial condition. We are unable to predict the full impact of any repeal, modification or delay in the implementation of the ACA on us at this time. Due to the substantial regulatory changes that will need to be implemented by CMS and others, and the numerous processes required to implement these reforms, we cannot predict which healthcare initiatives will be implemented at the federal or state level, the timing of any such reforms, or the effect such reforms or any other future legislation or regulation will have on our business.

Designation of and Exclusivity for Qualified Infectious Disease Products

In 2012, Congress passed legislation known as the Generating Antibiotic Incentives Now Act, or GAIN Act. This legislation is designed to encourage the development of antibacterial and antifungal drug products that treat pathogens that cause serious and life-threatening infections. To that end, the law grants an additional five years of marketing exclusivity upon the approval of an NDA for a drug product designated by FDA as a Qualified Infectious Disease Product, or QIDP. Thus, for a QIDP, the periods of five year new chemical entity exclusivity, three year new clinical investigation exclusivity and seven year orphan drug exclusivity, would become 10 years, eight years, and 12 years, respectively.

A QIDP is defined in the GAIN Act to mean “an antibacterial or antifungal drug for human use intended to treat serious or life-threatening infections, including those caused by—(1) an antibacterial or antifungal resistant pathogen, including novel or emerging infectious pathogens;” or (2) certain “qualifying pathogens.” A “qualifying pathogen” is a pathogen that has the potential to pose a serious threat to public health (e.g., resistant gram positive pathogens, multi-drug resistant gram negative bacteria, multi-drug resistant tuberculosis and *Clostridium difficile*) and that is included in a list established and maintained by FDA. A drug sponsor may request FDA to designate its product as a QIDP any time before the submission of an NDA. FDA must make a QIDP determination within 60 days of the designation request. A product designated as a QIDP will be granted priority review by FDA and can qualify for “fast track” status.

The additional five years of market exclusivity under the GAIN Act for drug products designated by FDA as QIDPs applies only to a drug that is first approved on or after July 9, 2012. Additionally, the five-year exclusivity extension does not apply to: a supplement to an application under Section 505(b) of the FDCA for any QIDP for which an extension is in effect or has expired; a subsequent application submitted with respect to a product approved by FDA for a change that results in a new indication, route of administration, dosing schedule, dosage form, delivery system, delivery device or strength; or a product that does not meet the definition of a QIDP under Section 505(g) based upon its approved uses.

Patent Term Restoration and Extension

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

Review and Approval of Drug Products in the European Union

In order to market any product outside of the United States, a company must also comply with numerous and varying regulatory requirements of other countries and jurisdictions regarding quality, safety and efficacy and governing, among other things, clinical trials, marketing authorization, commercial sales and distribution of drug products. Whether or not it obtains FDA approval for a product, the company would need to obtain the necessary approvals by the comparable non-U.S. regulatory authorities before it can commence clinical trials or marketing of the product in those countries or jurisdictions. The approval process ultimately varies between countries and jurisdictions and can involve additional product testing and additional administrative review periods. The time required to obtain approval in other countries and jurisdictions might differ from and be longer than that required to obtain FDA approval. Regulatory approval in one country or jurisdiction does not ensure regulatory approval in another, but a failure or delay in obtaining regulatory approval in one country or jurisdiction may negatively impact the regulatory process in others.

Pursuant to the European Clinical Trials Directive, a system for the approval of clinical trials in the European Union has been implemented through national legislation of the member states. Under this system, an applicant must obtain approval from the competent national authority of a European Union member state in which the clinical trial is to be conducted. Furthermore, the applicant may only start a clinical trial after a competent ethics committee has issued a favorable opinion. Clinical trial application must be accompanied by an investigational medicinal product dossier with supporting information prescribed by the European Clinical Trials Directive and corresponding national laws of the member states and further detailed in applicable guidance documents.

To obtain marketing approval of a drug under European Union regulatory systems, an applicant must submit a marketing authorization application, or MAA, either under a centralized or decentralized procedure.

The centralized procedure provides for the grant of a single marketing authorization by the European Commission that is valid for all European Union member states. The centralized procedure is compulsory for specific products, including for medicines produced by certain biotechnological processes, products designated as orphan medicinal products, advanced therapy products and products with a new active substance indicated for the treatment of certain diseases. For products with a new active substance indicated for the treatment of other diseases and products that are highly innovative or for which a centralized process is in the interest of patients, the centralized procedure may be optional.

Under the centralized procedure, the Committee for Medicinal Products for Human Use, or the CHMP, established at the European Medicines Agency, or EMA, is responsible for conducting the initial assessment of a drug. The CHMP is also responsible for several post-authorization and maintenance activities, such as the assessment of modifications or extensions to an existing marketing authorization. Under the centralized procedure in the European Union, the maximum timeframe for the evaluation of an MAA is 210 days, excluding clock stops, when additional information or written or oral explanation is to be provided by the applicant in response to questions of the CHMP. Accelerated evaluation might be granted by the CHMP in exceptional cases, when a medicinal product is of major interest from the point of view of public health and in particular from the viewpoint of therapeutic innovation. In this circumstance, the EMA ensures that the opinion of the CHMP is given within 150 days.

The decentralized procedure is available to applicants who wish to market a product in various European Union member states where such product has not received marketing approval in any European Union member states before. The decentralized procedure provides for approval by one or more other, or concerned, member states of an assessment of an application performed by one member state designated by the applicant, known as the reference member state. Under this procedure, an applicant submits an application based on identical dossiers and related materials, including a draft summary of product characteristics, and draft labeling and package leaflet, to the reference member state and concerned member states. The reference member state prepares a draft assessment report and drafts of the related materials within 210 days after receipt of a valid application. Within 90 days of receiving the reference member state's assessment report and related materials, each concerned member state must decide whether to approve the assessment report and related materials.

If a member state cannot approve the assessment report and related materials on the grounds of potential serious risk to public health, the disputed points are subject to a dispute resolution mechanism and may eventually be referred to the European Commission, whose decision is binding on all member states.

Pharmaceutical Coverage, Pricing and Reimbursement

Significant uncertainty exists as to the coverage and reimbursement status of products approved by FDA and other government authorities. Sales of products will depend, in part, on the extent to which the costs of the products will be covered by third party payors, including government health programs in the United States such as Medicare and Medicaid, commercial health insurers and managed care organizations. The process for determining whether a payor will provide coverage for a product may be separate from the process for setting the price or reimbursement rate that the payor will pay for the product once coverage is approved. Third party payors may limit coverage to specific products on an approved list, or formulary, which might not include all of the approved products for a particular indication. Additionally, the containment of healthcare costs has become a priority of federal and state governments, and the prices of drugs have been a focus in this effort. The U.S. government, state legislatures and foreign governments have shown significant interest in implementing cost-containment programs, including price controls, restrictions on reimbursement and requirements for substitution of generic products. Adoption of price controls and cost-containment measures, and adoption of more restrictive policies in jurisdictions with existing controls and measures, could further limit our net revenue and results.

In order to secure coverage and reimbursement for any product that might be approved for sale, a company may need to conduct expensive pharmacoeconomic studies in order to demonstrate the medical necessity and cost-effectiveness of the product, in addition to the costs required to obtain FDA or other comparable regulatory approvals. A payor's decision to provide coverage for a product does not imply that an adequate reimbursement rate will be approved. Third party reimbursement may not be sufficient to maintain price levels high enough to realize an appropriate return on investment in product development.

In the European Union, pricing and reimbursement schemes vary widely from country to country. Some countries provide that drug products may be marketed only after a reimbursement price has been agreed. Some countries may require the completion of additional studies that compare the cost-effectiveness of a particular product candidate to currently available therapies. For example, the European Union provides options for its member states to restrict the range of drug products for which their national health insurance systems provide reimbursement and to control the prices of medicinal products for human use. European Union member states may approve a specific price for a drug product or it may instead adopt a system of direct or indirect controls on the profitability of the company placing the drug product on the market. Other member states allow companies to fix their own prices for drug products, but monitor and control company profits. The downward pressure on health care costs in general, particularly prescription drugs, has become intense. As a result, increasingly high barriers are being erected to the entry of new products. In addition, in some countries, cross-border imports from low-priced markets exert competitive pressure that may reduce pricing within a country. Any country that has price controls or reimbursement limitations for drug products may not allow favorable reimbursement and pricing arrangements.

Healthcare Law and Regulation

Healthcare providers, physicians and third party payors play a primary role in the recommendation and prescription of drug products that are granted marketing approval. Arrangements with third party payors and customers are subject to broadly applicable fraud and abuse and other healthcare laws and regulations. Such restrictions under applicable federal and state healthcare laws and regulations, include the following:

- the federal healthcare anti-kickback statute prohibits, among other things, persons from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made, in whole or in part, under a federal healthcare program such as Medicare and Medicaid;
- the federal False Claims Act imposes civil penalties, and provides for civil whistleblower or qui tam actions, against individuals or entities for knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false or fraudulent or making a false statement to avoid, decrease or conceal an obligation to pay money to the federal government;

- the HIPAA imposes criminal and civil liability for executing a scheme to defraud any healthcare benefit program or making false statements relating to healthcare matters;
- HIPAA, as amended by the HITECH and its implementing regulations, also imposes obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of individually identifiable health information;
- the federal false statements statute prohibits knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statement in connection with the delivery of or payment for healthcare benefits, items or services;
- the federal transparency requirements under the ACA requires manufacturers of drugs to report to the Department of Health and Human Services information related to payments and other transfers of value to physicians and teaching hospitals and physician ownership and investment interests and the reported information will be made publicly available on a searchable website; and
- analogous state and foreign laws and regulations, such as state anti-kickback and false claims laws, may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third party payors, including private insurers.

Some state laws require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government in addition to requiring drug manufacturers to report information related to payments to physicians and other health care providers or marketing expenditures. State and foreign laws also govern the privacy and security of health information in some circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

Employees

As of March 31, 2017, we had 10 full-time employees.

Research and Development

For the years ended December 31, 2015 and December 31, 2016, we spent approximately \$5.3 million and \$3.9 million, respectively, on research and development activities. These expenses include cash and non-cash expenses relating to the development of our clinical and pre-clinical programs, including our anti-infective product candidates, MAT2203 and MAT2501 as well as support of our MAT9001 program which we are no longer actively pursuing.

Corporate and Available Information

We were incorporated in Delaware under the name Matinas BioPharma Holdings, Inc. in May 2013. We have two operating subsidiaries: Matinas BioPharma, Inc., a Delaware corporation, and Aquarius Biotechnologies Inc., a Delaware corporation. Nereus BioPharma LLC, a Delaware limited liability company (and Matinas BioPharma's predecessor) was formed on August 12, 2011. On February 29, 2012, Nereus BioPharma LLC converted from a limited liability company to a corporation and changed its name to Matinas BioPharma, Inc. In July 2013, Matinas BioPharma, Inc. entered into a merger agreement (the "2013 Merger Agreement") with Matinas Merger Sub, Inc., a Delaware corporation and our wholly owned subsidiary, or Merger Sub. Pursuant to the terms of the 2013 Merger Agreement, as a condition of and contemporaneously with the initial closing of the 2013 Private Placement, Merger Sub merged (the "2013 Merger") with and into Matinas BioPharma and Matinas BioPharma became a wholly owned subsidiary of ours. After consummation of the Merger transaction, the management of Matinas BioPharma became the management of Holdings and the board representatives consisted of four former Board members of Matinas BioPharma and Mr. Adam Stern as the Aegis Capital Corp. nominee. Because Holdings was formed solely to effect the 2013 Merger and the 2013 Private Placement, with no operations, and assets consisting solely of cash and cash equivalents, we accounted for the 2013 Merger as a reverse acquisition. The legal acquirer Matinas BioPharma becomes the successor entity, and its historical results became the historical results for Holdings (the legal acquirer and the registrant). On January 29, 2015, we acquired Aquarius Biotechnologies Inc. which was subsequently renamed Matinas BioPharma Nanotechnologies, Inc.

Our principal executive offices are located at 1545 Route 206 South, Suite 302, Bedminster, New Jersey 07921, and our telephone number is (908) 443-1860. Our website address is www.matinasbiopharma.com. Our website and the information contained on, or that can be accessed through, our website will not be deemed to be incorporated by reference into this Annual Report on Form 10-K or any other report we file with or furnish to the SEC.

We make available on our website, free of charge, our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and any amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, as soon as reasonably practicable after we electronically file such material with, or furnish it to, the Securities and Exchange Commission, or the SEC. Our SEC reports can be accessed through the Investors section of our internet website. Further, a copy of this Annual Report on Form 10-K is located at the SEC's Public Reference Rooms at 100 F Street, N.E., Washington, D. C. 20549. Information on the operation of the Public Reference Room can be obtained by calling the SEC at 1-800-SEC-0330. The SEC maintains a website that contains reports, proxy and information statements and other information regarding our filings at <http://www.sec.gov>.

Item 1A. Risk Factors

An investment in our common stock is speculative and involves a high degree of risk, including a risk of loss of your entire investment. You should carefully consider the risks described below and the other information in this Annual Report before purchasing shares of our common stock. The risks and uncertainties described below are not the only ones facing us. Additional risks and uncertainties may also adversely impair our business operations. If any of the events described in the risk factors below actually occur, our business, financial condition or results of operations could suffer significantly. In such event, the value of our common stock could decline, and you could lose all or a substantial portion of the money that you pay for our common stock.

Risks Related to Our Financial Position and Need for Additional Capital

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

We have incurred significant operating losses in every year since inception and expect to incur net operating losses for the foreseeable future. Our net loss was \$7.6 million and \$9.1 million for the years ended December 31, 2016 and 2015, respectively. As of December 31 2016, we had an accumulated deficit of \$35.2 million. We do not know whether or when we will become profitable. To date, we have not generated any revenues from product sales and have financed our operations primarily through private placements of our equity securities and, to a lesser extent, through funding from the National Institutes of Health, or the NIH. We have devoted substantially all of our financial resources and efforts to the research and development of potential product candidates. We are still in the early stages of development of our product candidates, and we have not completed development of any product candidate. We expect to continue to incur significant expenses and operating losses over the next several years. Our net losses may fluctuate significantly from quarter to quarter and year to year. Net losses and negative cash flows have had, and will continue to have, an adverse effect on our stockholders' deficit and working capital. We anticipate that our expenses will increase substantially if and as we:

- conduct Phase 2 clinical trials of MAT2203, our lead product candidate;
- initiate and continue the research and development of our other product candidates and potential product candidates, including MAT2501;
- seek to discover and develop additional product candidates;
- seek regulatory approvals for any product candidates that successfully complete clinical trials;
- establish a sales, marketing and distribution infrastructure in the future to commercialize any products for which we may obtain regulatory approval;
- require the manufacture of larger quantities of product candidates for clinical development and potentially commercialization;
- maintain, expand and protect our intellectual property portfolio;
- hire additional clinical, quality control and scientific personnel; and
- add operational, financial and management information systems and personnel, including personnel to support our product development and planned future commercialization efforts and personnel and infrastructure necessary to help us comply with our obligations as a public company.

Our ability to become and remain profitable depends on our ability to generate revenue. We do not expect to generate significant revenue unless and until we are able to obtain marketing approval for, and successfully commercialize, one or more of our product candidates. This will require us to be successful in a range of challenging activities, including completing preclinical testing and clinical trials of our product candidates, discovering additional product candidates, obtaining regulatory approval for these product candidates, manufacturing, marketing and selling any products for which we may obtain regulatory approval, satisfying any post-marketing requirements and obtaining reimbursement for our products from private insurance or government payors. We are only in the preliminary stages of most of these activities and have not yet commenced other of these activities. We may never succeed in these activities and, even if we do, may never generate revenues that are significant enough to achieve profitability.

Because of the numerous risks and uncertainties associated with pharmaceutical product development, we are unable to accurately predict the timing or amount of increased expenses or when, or if, we will be able to achieve profitability. If we are required by the U.S. Food and Drug Administration, or the FDA, or comparable non-U.S. regulatory authorities to perform studies in addition to those currently expected, or if there are any delays in completing our clinical trials or the development of any of our product candidates, our expenses could increase.

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

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

We expect our expenses to increase in connection with our ongoing activities, particularly as we conduct additional Phase 2 clinical trials of MAT2203 and advance MAT2501 further into clinical development, continue research and development, initiate clinical trials and, if development succeeds, seek regulatory approval of our product candidates. Our expenses could further increase if we initiate new research and preclinical development efforts for other product candidates. In addition, if we obtain regulatory approval for any of our product candidates, we expect to incur significant commercialization expenses related to product manufacturing, marketing, sales and distribution. Furthermore, we expect to incur significant additional costs associated with operating as a public company. Accordingly, we will need to obtain substantial additional funding in connection with our continuing operations. If we are unable to raise capital when needed or on attractive terms, we could be forced to delay, reduce or eliminate our research and development programs or any future commercialization efforts.

We believe that our existing cash and cash equivalents of approximately \$4.1 million as of December 31, 2016, and the approximate \$12.7 million raised with the close of our warrant tender offer on January 13, 2017, will enable us to fund our operating expenses and capital expenditure requirements through the second quarter of 2018. We have based this estimate on assumptions that may prove to be wrong in the future, and we could use our capital resources sooner than we currently expect. This estimate includes the additional costs associated with our new laboratory and manufacture facility which we began leasing on December 15, 2016. Changing circumstances could cause us to consume capital significantly faster than we currently anticipate, and we may need to spend more money than currently expected because of circumstances beyond our control. Our future capital requirements, both short-term and long-term, will depend on many factors, including:

- the progress, timing, costs and results of our ongoing and planned clinical trials of MAT2203;

- the scope, progress, timing, costs and results of clinical trials of, and research and preclinical development efforts for, other product candidates, including MAT2501, and any future product candidates;
- our ability to enter into and the terms and timing of any collaborations, licensing or other arrangements that we may establish;
- the number and development requirements of other product candidates that we pursue;
- the costs, timing and outcome of regulatory review of our product candidates by the FDA and comparable non-U.S. regulatory authorities;
- the costs and timing of future commercialization activities, including product manufacturing, marketing, sales and distribution, for any of our product candidates for which we receive marketing approval;
- the revenue, if any, received from commercial sales of our product candidates for which we receive marketing approval;
- our headcount growth and associated costs as we expand our research and development and establish a commercial infrastructure;
- the costs and timing of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property rights and defending any intellectual property-related claims;
- the extent to which we acquire or in-license other products and technologies;
- the costs of operating as a public company; and
- the effect of competing technological and market developments.

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

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

Until such time, if ever, as we can generate product revenues sufficient to achieve profitability, we expect to finance our cash needs through a combination of public or private equity offerings, debt financings, government or other third party funding, collaborations and licensing arrangements. We do not have any committed external source of funds other than limited grant funding from the NIH. To the extent that we raise additional capital through the sale of common stock, convertible securities or other equity securities, your ownership interest may be materially diluted, and the terms of these securities may include liquidation or other preferences and anti-dilution protections that could adversely affect your rights as a common stockholder. Debt financing and preferred equity financing, if available, would result in increased fixed payment obligations and may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends, that could adversely impact our ability to conduct our business. Securing additional financing could require a substantial amount of time and attention from our management and may divert a disproportionate amount of their attention away from day-to-day activities, which may adversely affect our management's ability to oversee the development of our product candidates.

If we raise additional funds through collaborations, strategic alliances or marketing, distribution or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams, research programs or product candidates or grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds through equity or debt financings when needed, we may be required to delay, limit, reduce or terminate our product development or future commercialization efforts or grant rights to develop and market product candidates that we would otherwise prefer to develop and market ourselves.

Our stockholders may be subject to substantial dilution by exercises of outstanding options and warrants, conversion of preferred shares and by the future issuance of common stock to the former stockholders of Aquarius pursuant to the terms of the merger agreement.

As of December 31, 2016, we had outstanding options to purchase an aggregate of 8,290,000 shares of our common stock at a weighted average exercise price of \$0.85 per share and warrants to purchase an aggregate of 40,255,234 shares of our common stock at a weighted average exercise price of \$1.16 per share. Subsequently, pursuant to the warrant tender offer completed in January 2017, an aggregate of 30,966,350 warrants were tendered and exercised on January 13, 2017. In addition, as of December 31, 2016, we had 1.6 million shares of preferred stock outstanding. Each share of preferred stock, may be converted into 10 shares of common stock upon the request of the holder. The conversion of preferred shares and the exercise of such outstanding options and the remaining warrants which as of March 15, 2017 were approximately 6,452,605 warrants, will result in dilution of the value of our shares. In addition, pursuant to the terms of the merger agreement with Aquarius Biotechnologies, Inc., we will be required to issue up to an additional 3,000,000 shares of our common stock upon the achievement of certain milestones. The milestone consideration consists of (i) 1,500,000 shares issuable upon the dosing of the first patient in a phase III trial sponsored by us for a product utilizing the cochleate delivery technology and (ii) 1,500,000 shares issuable upon FDA approval of the first NDA submitted by us for a product utilizing the cochleate delivery technology.

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

We commenced active operations in 2013 and have a limited operating history. Our product candidates are in early stages of clinical development. We have not yet demonstrated our ability to successfully obtain regulatory approvals for any of our product candidates, manufacture a commercial scale product, or arrange for a third party to do so on our behalf, or conduct sales and marketing activities necessary for successful product commercialization. Consequently, any predictions you make about our future success or viability may not be as accurate as they could be if we had a longer operating history.

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

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

Risks Related to Product Development, Regulatory Approval, Manufacturing and Commercialization

Our research and development of product candidates is primarily focused on the identification of product candidates for the treatment of human fungal and bacterial infections. Our approach is unproven and we do not know whether we will be successful in our efforts to use our cochleate delivery platform to build a pipeline of product candidates or if we will be able to develop any products of commercial value.

Our scientific approach to the development of anti-infective medicines focuses on using our proprietary technology to deliver therapies for the treatment of human fungal and bacterial infections. Any product candidates that we develop may not be effective and we may not be successful in using our cochleate delivery platform to build a pipeline of anti-infective medications and progress these product candidates through clinical development for the treatment of any medical conditions.

Even if we are successful in continuing to build our pipeline, we may not be able to develop product candidates that are safe and effective. Our research programs may initially show promise in creating potential product candidates, yet fail to yield viable product candidates for further clinical development for a number of reasons, including as a result of being shown to have harmful side effects or other characteristics that indicate that they are unlikely to be products that will receive marketing approval and achieve market acceptance. Our research programs to identify new product candidates will require substantial technical, financial and human resources. In addition, we may focus our efforts and resources on one or more potential product candidates that ultimately prove to be unsuccessful. If we are unable to identify suitable additional compounds for preclinical and clinical development, our ability to develop product candidates and obtain product revenues in future periods could be compromised, which could result in significant harm to our financial position and adversely impact our stock price.

We are early in our development efforts, which may not be successful.

We are currently conducting two Phase 2 clinical trials of MAT2203. We also recently completed a Phase 1 trial of MAT2501 in healthy volunteers. Because of the early stage of our development efforts, we are still in the process of determining the overall clinical development path for our current and future product candidates. As a result, the timing and costs of the regulatory paths we will follow and marketing approvals remain uncertain. Our ability to generate product revenue, which we do not expect will occur for many years, if ever, will depend heavily on the successful development and eventual commercialization of our early-stage product candidates. The success of MAT2203, MAT2501, and any other product candidates we may develop will depend on many factors, including the following:

- successful completion of preclinical studies;
- successful enrollment in, and completion of, clinical trials;
- demonstrating safety and efficacy;
- receipt of marketing approvals from applicable regulatory authorities;
- establishing clinical and commercial manufacturing capabilities or making arrangements with third-party manufacturers;
- obtaining and maintaining patent and trade secret protection and non-patent exclusivity for our product candidates and technologies;
- launching commercial sales of the product candidates, if and when approved, whether alone or selectively in collaboration with others;
- acceptance of the product candidates, if and when approved, by patients, the medical community and third-party payers;
- effectively competing with other therapies;
- a continued acceptable safety profile of the products following approval; and
- enforcing and defending intellectual property rights and claims.

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

We cannot be certain that MAT2203, MAT2501 or any other product candidates that we may develop will receive regulatory approval, and without regulatory approval we will not be able to market any of our product candidates. Any delay in the regulatory review or approval of any of our product candidates will materially or adversely harm our business.

We expect to invest most of our capital in the development of MAT2203, MAT2501 and other product candidates derived from our cochleate delivery platform technology. Our ability to generate revenue related to product sales, which we do not expect will occur for at least the next several years, if ever, will depend on the successful development and regulatory approval of one or more of our product candidates. All of our product candidates require regulatory review and approval prior to commercialization. Any delays in the regulatory review or approval of our product candidates would delay market launch, increase our cash requirements and result in additional operating losses. This failure to obtain regulatory approvals would prevent our product candidate from being marketed and would have a material and adverse effect on our business.

The process of obtaining FDA and other required regulatory approvals, including foreign approvals, often takes many years and can vary substantially based upon the type, complexity and novelty of the products involved. Furthermore, this approval process is extremely complex, expensive and uncertain. We may be unable to submit any new drug application, or an NDA, in the United States or any marketing approval application in foreign jurisdictions for any of our products. If we submit an NDA including any amended NDA or supplemental NDA, to the FDA seeking marketing approval for any of our product candidates, the FDA must decide whether to accept or reject the submission for filing. We cannot be certain that any of these submissions will be accepted for filing and reviewed by the FDA, or that the marketing approval application submissions to any other regulatory authorities will be accepted for filing and review by those authorities. We cannot be certain that we will be able to respond to any regulatory requests during the review period in a timely manner, or at all, without delaying potential regulatory action. We also cannot be certain that any of our product candidates will receive favorable recommendations from any FDA advisory committee or foreign regulatory bodies or be approved for marketing by the FDA or foreign regulatory authorities. In addition, delays in approvals or rejections of marketing applications may be based upon many factors, including regulatory requests for additional analyses, reports, data and studies, regulatory questions regarding data and results, changes in regulatory policy during the period of product development and the emergence of new information regarding such product candidates.

Data obtained from preclinical studies and clinical trials are subject to different interpretations, which could delay, limit or prevent regulatory review or approval of any of our product candidates. Furthermore, regulatory attitudes towards the data and results required to demonstrate safety and efficacy can change over time and can be affected by many factors, such as the emergence of new information, including on other products, policy changes and agency funding, staffing and leadership. We do not know whether future changes to the regulatory environment will be favorable or unfavorable to our business prospects.

In addition, the environment in which our regulatory submissions may be reviewed changes over time. For example, average review times at the FDA for NDAs have fluctuated over the last ten years, and we cannot predict the review time for any of our submissions with any regulatory authorities. Review times can be affected by a variety of factors, including budget and funding levels and statutory, regulatory and policy changes. Moreover, in light of widely publicized events concerning the safety risk of certain drug products, regulatory authorities, members of the U.S. Government Accountability Office, medical professionals and the general public have raised concerns about potential drug safety issues. These events have resulted in the withdrawal of drug products, revisions to drug labeling that further limit use of the drug products and establishment of REMS measures that may, for instance, restrict distribution of drug products. The increased attention to drug safety issues may result in a more cautious approach by the FDA to clinical trials. Data from clinical trials may receive greater scrutiny with respect to safety, which may make the FDA or other regulatory authorities more likely to terminate clinical trials before completion, or require longer or additional clinical trials that may result in substantial additional expense and a delay or failure in obtaining approval or may result in approval for a more limited indication than originally sought.

We depend on technology owned or licensed to us by third parties, and the loss of access to this technology would terminate or delay the further development of our product candidates, injure our reputation or force us to pay higher royalties.

We rely completely on the cochleate delivery platform technology that we have licensed from Rutgers. The loss of access to this technology would materially impair our business and future viability, and could result in delays in developing, introducing or maintaining our product candidates and formulations until equivalent technology, if available, is identified, licensed and integrated. In addition, any defects in the technology we license could prevent the implementation or impair the functionality of our product candidates or formulation, delay new product or formulation introductions or injure our reputation. If we are required to enter into license agreements with third parties for replacement technology, we could be subject to higher royalty payments.

Clinical drug development involves a lengthy and expensive process with uncertain outcomes that may lead to delayed timelines and increased cost, and may prevent us from being able to complete clinical trials.

Clinical testing is expensive, can take many years to complete, and its outcome is inherently uncertain. The results of preclinical and clinical studies of our product candidates may not be predictive of the results of later-stage clinical trials. For example, the positive results generated to date in Phase 1 clinical studies for MAT2203 do not ensure that our Phase 2 clinical trials will demonstrate similar results. Product candidates in later stages of clinical trials may fail to show the desired safety and efficacy despite having progressed through preclinical studies and initial clinical trials. A number of companies in the pharmaceutical industry have suffered significant setbacks in advanced clinical trials due to lack of efficacy or adverse safety profiles, notwithstanding promising results in earlier studies, and we cannot be certain that we will not face similar setbacks.

We cannot be certain that the Phase 2 clinical trials for MAT2203, or any other future clinical trials for MAT2203 or any of our other product candidates, will begin on time, not need to be redesigned, enroll an adequate number of patients on time or be completed on schedule, if at all, or that any interim analyses with respect to such trials will be completed on schedule or support continued clinical development of the associated product candidate. The Phase 2a clinical trial for MAT2203 is being conducted in cooperation with and funded by the NIH and as a result can be delayed by the NIH for many reasons, including changing priorities in the NIH or other factors outside our control.

We could also encounter delays if a clinical trial is suspended or terminated by us upon recommendation of the data monitoring committee for such trial, by the IRBs of the institutions in which such trials are being conducted, or by the FDA or other regulatory authorities. Such authorities may suspend or terminate a clinical trial due to a number of factors, including failure to conduct the clinical trial in accordance with regulatory requirements or our clinical protocols, inspection of the clinical trial operations or trial site by the FDA or other regulatory authorities resulting in the imposition of a clinical hold, unforeseen safety issues or adverse side effects, failure to demonstrate a benefit from using a drug, changes in governmental regulations or administrative actions, or lack of adequate funding to continue the clinical trial.

If we experience delays in the completion of, or termination of, any clinical trial of our product candidates, the commercial prospects of our product candidates may be harmed, and our ability to generate revenue from the sale of any of these product candidates will be delayed. In addition, any delays in completing our clinical trials will increase our costs, slow down our product candidate development and approval processes, and jeopardize our ability to commence product sales and generate revenue. Any of these occurrences may significantly harm our business, financial condition and prospects significantly.

Delays in the commencement, enrollment and completion of our clinical trials could result in increased costs to us and delay or limit our ability to obtain regulatory approval for MAT2203 and our other product candidates.

Delays in the commencement, enrollment and completion of clinical trials could increase our product development costs or limit the regulatory approval of our product candidates. The commencement, enrollment and completion of clinical trials can be delayed for a variety of reasons, including:

- inability to force the NIH to commence or complete planned clinical studies, despite the existence of contractual agreements;
- inability to reach agreements on acceptable terms with prospective contract research organizations (CROs) and trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites;
- inability to maintain necessary supplies of study drug and comparator to maintain predicted enrollment rates at clinical trial sites;
- regulatory objections to commencing a clinical trial;
- inability to identify and maintain a sufficient number of trial sites, many of which may already be engaged in other clinical trial programs, including some that may be for the same indication as our product candidates;
- withdrawal of clinical trial sites from our clinical trials as a result of changing standards of care or the ineligibility of a site to participate in our clinical trials;

- inability to obtain institutional review board approval, including that within the NIH, to conduct a clinical trial;
- difficulty recruiting and enrolling subjects to participate in clinical trials for a variety of reasons, including meeting the enrollment criteria for our study and competition from other clinical trial programs for the same indication as our product candidates;
- inability to retain subjects in clinical trials due to the treatment protocol, personal issues, side effects from the therapy or lack of efficacy; and
- difficulty in importing and exporting clinical trial materials and study samples.

We may not have or be able to obtain sufficient quantities of our products to meet our supply and clinical studies obligations and our business, financial condition and results of operation may be adversely affected.

To date, we have only developed limited in-house manufacturing capabilities for the cochleates needed for the clinical development our MAT2203 and MAT2501 product candidates. If we do not develop a long term in-house manufacturing capability for the cochleates needed for our MAT2203 and MAT2501 product candidates sufficient to produce product for continued development and, if regulatory approval is obtained, then commercialization of these products, we will be dependent on a small number of third-party manufacturers for the manufacture of our product candidates. We may not have long-term agreements with any of these third parties, and if they are unable or unwilling to perform for any reason, we may not be able to locate alternative acceptable manufacturers or formulators or enter into favorable agreements with them. Any inability to acquire sufficient quantities of our products in a timely manner from these third parties could delay clinical trials and prevent us from developing our products in a cost-effective manner or on a timely basis. In addition, manufacturers of our product candidates are subject to cGMP and similar foreign standards and we would not have control over compliance with these regulations by our manufacturers. If one of our contract manufacturers fails to maintain compliance, the production of our products could be interrupted, resulting in delays and additional costs. In addition, if the facilities of such manufacturers do not pass a pre-approval or post-approval plant inspection, the FDA will not grant approval and may institute restrictions on the marketing or sale of our products.

We may be reliant on third party manufactures and suppliers to meet the demands of our clinical supplies. Delays in receipt of materials, scheduling, release, custom's control, and regulatory compliance issues may adversely impact our ability to initiate, maintain, or complete clinical trials that we are sponsoring. Commercial manufacturing and supply agreements have not been established. Issues arising from scale-up, environmental controls, equipment requirements, or other factors, may have an adverse impact on our ability to manufacture our product candidates.

Even if we obtain regulatory approval for our product candidates, if we are unable to successfully commercialize our products, it will limit our ability to generate revenue and will materially adversely affect our business, financial condition and results of operations.

Even if we obtain regulatory approval for our product candidates, our long-term viability and growth depend on the successful commercialization of products which lead to revenue and profits. Pharmaceutical product development is an expensive, high risk, lengthy, complicated, resource intensive process. In order to succeed, among other things, we must be able to:

- identify potential drug product candidates;
- design and conduct appropriate laboratory, preclinical and other research;
- submit for and receive regulatory approval to perform clinical studies;
- design and conduct appropriate preclinical and clinical studies according to good laboratory and good clinical practices;
- select and recruit clinical investigators;
- select and recruit subjects for our studies;
- collect, analyze and correctly interpret the data from our studies;
- submit for and receive regulatory approvals for marketing; and
- manufacture the drug product candidates according to cGMP.

The development program with respect to any given product will take many years and thus delay our ability to generate profits. In addition, potential products that appear promising at early stages of development may fail for a number of reasons, including the possibility that the products may require significant additional testing or turn out to be unsafe, ineffective, too difficult or expensive to develop or manufacture, too difficult to administer, or unstable. Failure to successfully commercialize our products will adversely affect our business, financial condition and results of operations.

If our preclinical and clinical studies do not produce positive results, if our clinical trials are delayed or if serious side effects are identified during such studies or trials, we may experience delays, incur additional costs and ultimately be unable to commercialize our product candidates.

Before obtaining regulatory approval for the sale of our product candidates, we must conduct, generally at our own expense, extensive preclinical tests to demonstrate the safety of our product candidates in animals, and clinical trials to demonstrate the safety and efficacy of our product candidates in humans. Preclinical and clinical testing is expensive, difficult to design and implement and can take many years to complete. A failure of one or more of our preclinical studies or clinical trials can occur at any stage of testing. We may experience numerous unforeseen events during, or as a result of, preclinical testing and the clinical trial process that could delay or prevent our ability to obtain regulatory approval or commercialize our product candidates, including:

- our preclinical tests or clinical trials may produce negative or inconclusive results, and we may decide, or regulators may require us, to conduct additional preclinical testing or clinical trials or we may abandon projects that we expect to be promising;
- regulators or institutional review boards may not authorize us to commence a clinical trial or conduct a clinical trial at a prospective trial site;
- conditions imposed on us by the FDA or any non-U.S. regulatory authority regarding the scope or design of our clinical trials may require us to resubmit our clinical trial protocols to institutional review boards for re-inspection due to changes in the regulatory environment;
- the number of patients required for our clinical trials may be larger than we anticipate or participants may drop out of our clinical trials at a higher rate than we anticipate;
- our third party contractors or clinical investigators may fail to comply with regulatory requirements or fail to meet their contractual obligations to us in a timely manner;
- we might have to suspend or terminate one or more of our clinical trials if we, the regulators or the institutional review boards determine that the participants are being exposed to unacceptable health risks;
- regulators or institutional review boards may require that we hold, suspend or terminate clinical research for various reasons, including noncompliance with regulatory requirements;
- the cost of our clinical trials may be greater than we anticipate;
- the supply or quality of our product candidates or other materials necessary to conduct our clinical trials may be insufficient or inadequate or we may not be able to reach agreements on acceptable terms with prospective clinical research organizations; and
- the effects of our product candidates may not be the desired effects or may include undesirable side effects or the product candidates may have other unexpected characteristics.

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

- be delayed in obtaining, or may not be able to obtain, marketing approval for one or more of our product candidates;
- obtain approval for indications that are not as broad as intended or entirely different than those indications for which we sought approval; or
- have the product removed from the market after obtaining marketing approval.

Our product development costs will also increase if we experience delays in testing or approvals. We do not know whether any preclinical tests or clinical trials will be initiated as planned, will need to be restructured or will be completed on schedule, if at all. Significant preclinical or clinical trial delays also could shorten the patent protection period during which we may have the exclusive right to commercialize our product candidates. Such delays could allow our competitors to bring products to market before we do and impair our ability to commercialize our products or product candidates.

If we cannot enroll enough patients to complete our clinical trials, such failure may adversely affect our business, financial condition and results of operations.

The completion rate of clinical studies of our products is dependent on, among other factors, the patient enrollment rate. Patient enrollment is a function of many factors, including:

- investigator identification and recruitment;
- regulatory approvals to initiate study sites;
- patient population size;
- the nature of the protocol to be used in the trial;
- patient proximity to clinical sites;
- eligibility criteria for the study;
- competition from other companies' clinical studies for the same patient population; and
- ability to obtain comparator drug/device.

We believe our procedures for enrolling patients have been appropriate; however, delays in patient enrollment would increase costs and delay ultimate commercialization and sales, if any, of our products. Such delays could materially adversely affect our business, financial condition and results of operations.

If we are not successful in discovering, developing and commercializing additional product candidates, our ability to expand our business and achieve our strategic objectives would be impaired.

A key element of our strategy is to leverage our cochleate drug delivery technology platform to discover, develop and commercialize a portfolio of product candidates. We are seeking to do so through our internal research programs and are exploring, and may also explore in the future, strategic partnerships for the development of new products. Other than MAT2203 and MAT2501, all of our other potential cochleate-related product candidates remain in the discovery and preclinical stages.

Research programs to identify product candidates require substantial technical, financial and human resources, whether or not any product candidates are ultimately identified. Our research programs may initially show promise in identifying potential product candidates, yet fail to yield product candidates for clinical development for many reasons, including the following:

- the research methodology used may not be successful in identifying potential product candidates;
- we may be unable to identify viable product candidates in our screening campaigns;
- competitors may develop alternatives that render our product candidates obsolete;
- product candidates we develop may nevertheless be covered by third parties' patents or other exclusive rights;
- a product candidate may, on further study, be shown to have harmful side effects or other characteristics that indicate it is unlikely to be effective or otherwise does not meet applicable regulatory criteria;
- a product candidate may not be capable of being produced in commercial quantities at an acceptable cost, or at all;
- a product candidate may not be accepted as safe and effective by patients, the medical community or third-party payors; and
- the development of bacterial resistance to potential product candidates may render them ineffective against target infections.

If we are unsuccessful in identifying and developing additional product candidates, our potential for growth may be impaired.

Even if we receive regulatory approval for MAT2203, MAT2501 or any other product candidates we may develop, we still may not be able to successfully commercialize it and the revenue that we generate from its sales, if any, may be limited.

If approved for marketing, the commercial success of MAT2203, MAT2501 or any other product candidates we may develop will depend upon its acceptance by the medical community, including physicians, patients and health care payors. The degree of market acceptance of MAT2203, MAT2501 or such other product candidate will depend on a number of factors, including:

- demonstration of clinical safety and efficacy of such product candidate;
- relative convenience and ease of administration;
- the prevalence and severity of any adverse effects;
- the willingness of physicians to prescribe such product candidates and of the target patient population to try new therapies;
- pricing and cost-effectiveness;
- the inclusion or omission of such product candidate in applicable treatment guidelines;
- the effectiveness of our or any future collaborators' sales and marketing strategies;
- limitations or warnings contained in FDA-approved labeling;
- our ability to obtain and maintain sufficient third-party coverage or reimbursement from government health care programs, including Medicare and Medicaid, private health insurers and other third-party payors; and
- the willingness of patients to pay out-of-pocket in the absence of third-party coverage or reimbursement.

If MAT2203, MAT2501, or any other product candidates we may develop is approved, but does not achieve an adequate level of acceptance by physicians, health care payors and patients, we may not generate sufficient revenue and we may not be able to achieve or sustain profitability. Our efforts to educate the medical community and third-party payors on the benefits of such product candidate may require significant resources and may never be successful.

In addition, even if we obtain regulatory approvals, the timing or scope of any approvals may prohibit or reduce our ability to commercialize such product candidate successfully. For example, if the approval process takes too long, we may miss market opportunities and give other companies the ability to develop competing products or establish market dominance. Any regulatory approval we ultimately obtain may be limited or subject to restrictions or post-approval commitments that render such product candidate not commercially viable. For example, regulatory authorities may approve such product candidate for fewer or more limited indications than we request, may not approve the price we intend to charge for such product candidate, may grant approval contingent on the performance of costly post-marketing clinical trials, or may approve such product candidate with a label that does not include the labeling claims necessary or desirable for the successful commercialization of that indication. Further, the FDA may place conditions on approvals including potential requirements or risk management plans and the requirement for a Risk Evaluation and Mitigation Strategy ("REMS") to assure the safe use of the drug. If the FDA concludes a REMS is needed, the sponsor of the NDA must submit a proposed REMS; the FDA will not approve the NDA without an approved REMS, if required. A REMS could include medication guides, physician communication plans, or elements to assure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. Any of these limitations on approval or marketing could restrict the commercial promotion, distribution, prescription or dispensing of such product candidate. Moreover, product approvals may be withdrawn for non-compliance with regulatory standards or if problems occur following the initial marketing of the product. Any of the foregoing scenarios could materially harm the commercial success of such product candidate.

We currently have no sales and marketing organization. If we are unable to establish satisfactory sales and marketing capabilities, we may not successfully commercialize any of our product candidates, if regulatory approval is obtained.

At present, we have no sales or marketing personnel. In order to commercialize products that are approved for commercial sales, we must either develop a sales and marketing infrastructure or collaborate with third parties that have such commercial infrastructure. If we elect to develop our own sales and marketing organization, we do not intend to begin to hire sales and marketing personnel until the time of NDA submission to the FDA at the earliest, and we do not intend to establish our own sales organization in the United States until shortly prior to FDA approval of MAT2203, MAT2501 or any of our other product candidates.

We may not be able to establish a direct sales force in a cost-effective manner or realize a positive return on this investment. In addition, we will have to compete with established and well-funded pharmaceutical and biotechnology companies to recruit, hire, train and retain sales and marketing personnel. Factors that may inhibit our efforts to commercialize MAT2203, MAT2501 or any of our other product candidates in the United States without strategic partners or licensees include:

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

If we are not successful in recruiting sales and marketing personnel or in building a sales and marketing infrastructure, or if we do not successfully enter into appropriate collaboration arrangements, we will have difficulty successfully commercializing MAT2203, MAT2501 or any other product candidates we may develop, which would adversely affect our business, operating results and financial condition. Outside the United States, we may commercialize our product candidates by entering into collaboration agreements with pharmaceutical partners. We may not be able to enter into such agreements on terms acceptable to us or at all. In addition, even if we enter into such relationships, we may have limited or no control over the sales, marketing and distribution activities of these third parties. Our future revenues may depend heavily on the success of the efforts of these third parties

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

The biotechnology and pharmaceutical industries are intensely competitive and subject to rapid and significant technological change. We have competitors in a number of jurisdictions, many of which have substantially greater name recognition, commercial infrastructures and financial, technical and personnel resources than we have. Established competitors may invest heavily to quickly discover and develop novel compounds that could make MAT2203, MAT2501 or any other product candidates we may develop obsolete or uneconomical. Any new product that competes with an approved product may need to demonstrate compelling advantages in efficacy, cost, convenience, tolerability and safety to be commercially successful. Other competitive factors, including generic competition, could force us to lower prices or could result in reduced sales. In addition, new products developed by others could emerge as competitors to MAT2203, MAT2501 or any of our other product candidates. If we are not able to compete effectively against our current and future competitors, our business will not grow and our financial condition and operations will suffer.

We face competition from many different sources, including commercial pharmaceutical and biotechnology enterprises, academic institutions, government agencies and private and public research institutions. We face competition with respect to our current product candidates and we will face competition with respect to any product candidates that we may seek to develop or commercialize in the future. Our current and potential competitors in the anti-fungal marketplace for which we are developing MAT2203 include Merck & Co. Inc., Astellas Pharma US, Pfizer, Inc., Novartis AG, Viamet Inc., Cidara Therapeutics, Scynexis Inc. and Sigma Tau. With respect to competition for MAT2501 in the anti-bacterial marketplace, our current and potential competitors include Insmed Incorporated, Merck & Co., Tetrphase Pharmaceuticals, Inc., Achaogen, Inc., Raptor Pharmaceuticals and The Medicines Company.

Even if we obtain marketing approval for MAT2203, MAT2501 or any other product candidates that we may develop, we will be subject to ongoing obligations and continued regulatory review, which may result in significant additional expense. Additionally, our product candidates could be subject to labeling and other restrictions and withdrawal from the market and we may be subject to penalties if we fail to comply with regulatory requirements or if we experience unanticipated problems with our future products.

Even if we obtain United States regulatory approval of MAT2203, MAT2501 or any other product candidates that we may develop, FDA may still impose significant restrictions on its indicated uses or marketing or the conditions of approval, or impose ongoing requirements for potentially costly and time-consuming post-approval studies, and post-market surveillance to monitor safety and efficacy. Our future products will also be subject to ongoing regulatory requirements governing the manufacturing, labeling, packaging, storage, distribution, safety surveillance, advertising, promotion, recordkeeping and reporting of adverse events and other post-market information. These requirements include registration with FDA, as well as continued compliance with current Good Clinical Practices regulations, or cGCPs, for any clinical trials that we conduct post-approval. In addition, manufacturers of drug products and their facilities are subject to continuous review and periodic inspections by the FDA and other regulatory authorities for compliance with current good manufacturing practices, cGMP, requirements relating to quality control, quality assurance and corresponding maintenance of records and documents.

FDA has the authority to require a REMS, as part of an NDA or after approval, which may impose further requirements or restrictions on the distribution or use of an approved drug, such as limiting prescribing to certain physicians or medical centers that have undergone specialized training, limiting treatment to patients who meet certain safe-use criteria or requiring patient testing, monitoring and/or enrollment in a registry.

With respect to sales and marketing activities by us or any future partner, advertising and promotional materials must comply with FDA rules in addition to other applicable federal, state and local laws in the United States and similar legal requirements in other countries. In the United States, the distribution of product samples to physicians must comply with the requirements of the U.S. Prescription Drug Marketing Act. Application holders must obtain FDA approval for product and manufacturing changes, depending on the nature of the change. We may also be subject, directly or indirectly through our customers and partners, to various fraud and abuse laws, including, without limitation, the U.S. Anti-Kickback Statute, U.S. False Claims Act, and similar state laws, which impact, among other things, our proposed sales, marketing, and scientific/educational grant programs. If we participate in the U.S. Medicaid Drug Rebate Program, the Federal Supply Schedule of the U.S. Department of Veterans Affairs, or other government drug programs, we will be subject to complex laws and regulations regarding reporting and payment obligations. All of these activities are also potentially subject to U.S. federal and state consumer protection and unfair competition laws. Similar requirements exist in many of these areas in other countries.

In addition, our product labeling, advertising and promotion would be subject to regulatory requirements and continuing regulatory review. FDA strictly regulates the promotional claims that may be made about prescription products. In particular, a product may not be promoted for uses that are not approved by FDA as reflected in the product's approved labeling. If we receive marketing approval for our product candidates, physicians may nevertheless legally prescribe our products to their patients in a manner that is inconsistent with the approved label. If we are found to have promoted such off-label uses, we may become subject to significant liability and government fines. FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses, and a company that is found to have improperly promoted off-label uses may be subject to significant sanctions, including revocation of its marketing approval. The federal government has levied large civil and criminal fines against companies for alleged improper promotion and has enjoined several companies from engaging in off-label promotion. FDA has also requested that companies enter into consent decrees of permanent injunctions under which specified promotional conduct is changed or curtailed.

If we or a regulatory agency discovers previously unknown problems with a product, such as adverse events of unanticipated severity or frequency, problems with the facility where the product is manufactured, or we or our manufacturers fail to comply with applicable regulatory requirements, we may be subject to the following administrative or judicial sanctions:

- restrictions on the marketing or manufacturing of the product, withdrawal of the product from the market, or voluntary or mandatory product recalls;
- issuance of warning letters or untitled letters;
- clinical holds;
- injunctions or the imposition of civil or criminal penalties or monetary fines;
- suspension or withdrawal of regulatory approval;
- suspension of any ongoing clinical trials;
- refusal to approve pending applications or supplements to approved applications filed by us, or suspension or revocation of product license approvals;
- suspension or imposition of restrictions on operations, including costly new manufacturing requirements; or
- product seizure or detention or refusal to permit the import or export of product.

The occurrence of any event or penalty described above may inhibit our ability to commercialize MAT2203 or any of our other product candidates and generate revenue. Adverse regulatory action, whether pre- or post-approval, can also potentially lead to product liability claims and increase our product liability exposure.

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

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

Legislative and regulatory proposals have been made to expand post-approval requirements and restrict sales and promotional activities for pharmaceutical products. We do not know whether additional legislative changes will be enacted, or whether the FDA regulations, guidance or interpretations will be changed, or what the impact of such changes on the marketing approvals of our product candidate¹, if any, may be. In addition, increased scrutiny by the U.S. Congress of the FDA's approval process may significantly delay or prevent marketing approval, as well as subject us to more stringent product labeling and post-marketing testing and other requirements.

In the United States, the Medicare Modernization Act, or MMA, changed the way Medicare covers and pays for pharmaceutical products. The legislation expanded Medicare coverage for drug purchases by the elderly and introduced a reimbursement methodology based on average sales prices for drugs. In addition, this legislation authorized Medicare Part D prescription drug plans to use formularies where they can limit the number of drugs that will be covered in any therapeutic class. As a result of this legislation and the expansion of federal coverage of drug products, we expect that there will be additional pressure to contain and reduce costs. These cost reduction initiatives and other provisions of this legislation could decrease the coverage and price that we receive for MAT2203, MAT2501 or any other product candidates that we may develop and could seriously harm our business. While the MMA applies only to drug benefits for Medicare beneficiaries, private payors often follow Medicare coverage policy and payment limitations in setting their own reimbursement rates, and any reduction in reimbursement that results from the MMA may result in a similar reduction in payments from private payors.

In March 2010, President Obama signed into law the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Affordability Reconciliation Act of 2010 or, collectively, the ACA, a sweeping law intended to broaden access to health insurance, reduce or constrain the growth of healthcare spending, enhance remedies against fraud and abuse, add new transparency requirements for healthcare and health insurance industries, impose new taxes and fees on the health industry and impose additional health policy reforms. Effective October 1, 2010, the ACA revised the definition of "average manufacturer price" for reporting purposes, which could increase the amount of Medicaid drug rebates to states. Further, the law imposed a significant annual fee on companies that manufacture or import branded prescription drug products. Substantial provisions affecting compliance have also been enacted, which may require us to modify our business practices with healthcare practitioners, and incur substantial costs to ensure compliance. Although it is too early to determine the effect of the Affordable Care Act, the law appears likely to continue the pressure on pharmaceutical pricing, especially under the Medicare program, and may also increase our regulatory burdens and operating costs. Legislative and regulatory proposals have been made to expand post-approval requirements and restrict sales and promotional activities for pharmaceutical products. We cannot be sure whether additional legislative changes will be enacted, or whether FDA regulations, guidance or interpretations will be changed, or what the impact of such changes on the marketing approvals of our product candidates, if any, may be. In addition, increased scrutiny by the U.S. Congress of FDA's approval process may significantly delay or prevent marketing approval, as well as subject us to more stringent product labeling and post-marketing testing and other requirements.

The ACA remains subject to legislative efforts to repeal, modify or delay the implementation of the law. Efforts to date have generally been unsuccessful as a result of the balance of power in Congress and the President's veto power. However, the recent Presidential and Congressional elections, which resulted in the election of the Republican presidential nominee and Republican majorities in both houses of Congress, have resulted in additional efforts to repeal, modify or delay implementation of the ACA. If the ACA is repealed or modified, or if implementation of certain aspects of the ACA are delayed, such repeal, modification or delay may materially adversely impact our business, strategies, prospects, operating results or financial condition. We are unable to predict the full impact of any repeal, modification or delay in the implementation of the ACA on us at this time. Due to the substantial regulatory changes that will need to be implemented by CMS and others, and the numerous processes required to implement these reforms, we cannot predict which healthcare initiatives will be implemented at the federal or state level, the timing of any such reforms, or the effect such reforms or any other future legislation or regulation will have on our business.

Our future growth depends, in part, on our ability to penetrate foreign markets, where we would be subject to additional regulatory burdens and other risks and uncertainties.

Our future profitability will depend, in part, on our ability to commercialize our product candidates in foreign markets for which we intend to rely on collaborations with third parties. If we commercialize MAT 2203, MAT2501 or any other product candidates that we may develop in foreign markets, we would be subject to additional risks and uncertainties, including:

- our customers' ability to obtain reimbursement for our product candidates in foreign markets;
- our inability to directly control commercial activities because we are relying on third parties;
- the burden of complying with complex and changing foreign regulatory, tax, accounting and legal requirements;
- different medical practices and customs in foreign countries affecting acceptance in the marketplace;
- import or export licensing requirements;
- longer accounts receivable collection times;
- longer lead times for shipping;
- language barriers for technical training;
- reduced protection of intellectual property rights in some foreign countries;
- foreign currency exchange rate fluctuations; and
- the interpretation of contractual provisions governed by foreign laws in the event of a contract dispute.

Foreign sales of our product candidates could also be adversely affected by the imposition of governmental controls, political and economic instability, trade restrictions and changes in tariffs, any of which may adversely affect our results of operations.

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

FDA enforces laws and regulations which require that the promotion of pharmaceutical products be consistent with the approved prescribing information. While physicians may prescribe an approved product for a so-called "off label" use, it is unlawful for a pharmaceutical company to promote its products in a manner that is inconsistent with its approved label and any company which engages in such conduct can subject that company to significant liability. Similarly, industry codes in the EU and other foreign jurisdictions prohibit companies from engaging in off-label promotion and regulatory agencies in various countries enforce violations of the code with civil penalties. While we intend to ensure that our promotional materials are consistent with our label, regulatory agencies may disagree with our assessment and may issue untitled letters, warning letters or may institute other civil or criminal enforcement proceedings. In addition to FDA restrictions on marketing of pharmaceutical products, several other types of state and federal healthcare fraud and abuse laws have been applied in recent years to restrict certain marketing practices in the pharmaceutical industry. These laws include the U.S. Anti-Kickback Statute, U.S. False Claims Act and similar state laws. Because of the breadth of these laws and the narrowness of the safe harbors, it is possible that some of our business activities could be subject to challenge under one or more of these laws.

The U.S. Anti-Kickback Statute prohibits, among other things, knowingly and willfully offering, paying, soliciting or receiving remuneration to induce, or in return for, purchasing, leasing, ordering or arranging for the purchase, lease or order of any healthcare item or service reimbursable under Medicare, Medicaid or other federally financed healthcare programs. This statute has been interpreted broadly to apply to arrangements between pharmaceutical manufacturers on the one hand and prescribers, purchasers and formulary managers on the other. Although there are several statutory exemptions and regulatory safe harbors protecting certain common activities from prosecution, the exemptions and safe harbors are drawn narrowly, and practices that involve remuneration intended to induce prescribing, purchasing or recommending may be subject to scrutiny if they do not qualify for an exemption or safe harbor. Our practices may not, in all cases, meet all of the criteria for safe harbor protection from anti-kickback liability. Moreover, recent health care reform legislation has strengthened these laws. For example, the ACA, among other things, amends the intent requirement of the U.S. Anti-Kickback Statute and criminal health care fraud statutes; a person or entity no longer needs to have actual knowledge of this statute or specific intent to violate it. In addition, the ACA provides that the government may assert that a claim including items or services resulting from a violation of the U.S. Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the U.S. False Claims Act. Federal false claims laws prohibit any person from knowingly presenting, or causing to be presented, a false claim for payment to the federal government or knowingly making, or causing to be made, a false statement to get a false claim paid.

Over the past few years, several pharmaceutical and other healthcare companies have been prosecuted under these laws for a variety of alleged promotional and marketing activities, such as: allegedly providing free trips, free goods, sham consulting fees and grants and other monetary benefits to prescribers; reporting to pricing services inflated average wholesale prices that were then used by federal programs to set reimbursement rates; engaging in off-label promotion that caused claims to be submitted to Medicare or Medicaid for non-covered, off-label uses; and submitting inflated best price information to the Medicaid Rebate Program to reduce liability for Medicaid rebates. Most states also have statutes or regulations similar to the U.S. Anti-Kickback Statute and the U.S. False Claims Act, which apply to items and services reimbursed under Medicaid and other state programs, or, in several states, apply regardless of the payor. Sanctions under these federal and state laws may include substantial civil monetary penalties, exclusion of a manufacturer's products from reimbursement under government programs, substantial criminal fines and imprisonment.

We have been and expect to be significantly dependent on our collaborative agreements for the development of our product candidates, which exposes us to the risk of reliance on the performance of third parties.

In conducting our research and development activities, we currently rely, and expect to continue to rely, on collaborative agreements with third parties such as manufacturers, contract research organizations, commercial partners, universities, governmental agencies and not-for-profit organizations for both strategic and financial resources. Key among these agreements is our collaboration agreements with the NIH for the development of MAT2203 and MAT2501. The loss of, or failure to perform by us or our partners under any applicable agreements or arrangements, or our failure to secure additional agreements for our product candidates, would substantially disrupt or delay our research and development activities, including our in-process and anticipated clinical trials. Any such loss would likely increase our expenses and materially harm our business, financial condition and results of operation.

We expect that we will rely on third parties to conduct clinical trials for our product candidates. If these third parties do not successfully carry out their contractual duties or meet expected deadlines, we may not be able to obtain regulatory approval for or commercialize MAT2203, MAT2501 or any other product candidates that we may develop and our business could be substantially harmed.

We expect to enter into agreements with third-party CROs, or governmental entities like the NIH, to conduct and manage our clinical programs. We rely heavily on these parties for execution of clinical studies for MAT2203, MAT2501 and our other product candidates and can control only certain and very limited aspects of their activities. Nevertheless, we would be responsible for ensuring that each of our studies is conducted in accordance with the applicable protocol, legal, regulatory and scientific standards, and our reliance on the NIH or CROs would not relieve us of our regulatory responsibilities. We, the NIH and our CROs would be required to comply with cGCPs, which are regulations and guidelines enforced by the FDA, the Competent Authorities of the Member States of the European Economic Area and comparable foreign regulatory authorities for any products in clinical development. The FDA enforces these cGCP regulations through periodic inspections of trial sponsors, principal investigators and trial sites. If we or the NIH or our CROs fail to comply with applicable cGCPs, the clinical data generated in our clinical trials may be deemed unreliable and the FDA or comparable foreign regulatory authorities may require us to perform additional clinical trials before approving our marketing applications. We cannot assure you that, upon inspection, the FDA will determine that any of our clinical trials comply with cGCPs. In addition, our clinical trials must be conducted with products produced under cGMP regulations and will require a large number of test subjects. Our failure or the failure of the NIH or our CROs to comply with these regulations may require us to repeat clinical trials, which would delay the regulatory approval process and could also subject us to enforcement action up to and including civil and criminal penalties.

As a result, many important aspects of our drug development programs would be outside of our direct control. In addition, the NIH or the CROs may not perform all of their obligations under their arrangements with us or in compliance with regulatory requirements. If NIH or the CROs do not perform clinical trials in a satisfactory manner, breach their obligations to us or fail to comply with regulatory requirements, the development and commercialization of MAT2203, MAT2501 or any other product candidates that we may develop may be delayed or our development program may be materially and irreversibly harmed. We cannot control the amount and timing of resources these CROs would devote to our program or our product candidates. If we are unable to rely on the clinical data collected by our CROs, we could be required to repeat, extend the duration of, or increase the size of our clinical trials, which could significantly delay commercialization and require significantly greater expenditures. If any of our relationships with these third-party CROs terminate, we may not be able to enter into arrangements with alternative CROs. As a result of the foregoing, our financial results and the commercial prospects for MAT2203, MAT2501 and our other product candidates would be harmed, our costs could increase and our ability to generate revenue could be delayed.

Reimbursement decisions by third-party payors may have an adverse effect on pricing and market acceptance of MAT2203, MAT2501 or any other product candidates that we may develop. If there is not sufficient reimbursement for our future products, it is less likely that such products will be widely used.

Market acceptance and sales of MAT2203, MAT2501 or any other product candidates for which we obtain regulatory approval will depend on reimbursement policies and may be affected by future healthcare reform measures in both the United States and foreign jurisdictions. Government authorities and third-party payors, such as private health insurers and health maintenance organizations, decide which products they will cover and establish payment levels. In addition, government authorities and these third-party payors are increasingly attempting to contain health care costs by demanding price discounts or rebates and limiting both the types and variety of products that they will cover and the amounts that they will pay for these products. In addition, we might need to conduct post-marketing studies in order to demonstrate the cost-effectiveness of any future products to such payors' satisfaction. Such studies might require us to commit a significant amount of management time and financial and other resources.

Reimbursement rates may vary according to the use of the product and the clinical setting in which it is used, may be based on payments allowed for lower-cost products that are already reimbursed, may be incorporated into existing payments for other products or services, and may reflect budgetary constraints and/or imperfections in Medicare or Medicaid data used to calculate these rates. Net prices for products may be reduced by mandatory discounts or rebates required by government health care programs. Such legislation, or similar regulatory changes or relaxation of laws that restrict imports of products from other countries, could reduce the net price we receive for any future marketed products. As a result, our future products might not ultimately be considered cost-effective.

We cannot be certain that reimbursement will be available for MAT2203, MAT2501 or any other product candidates that we develop. Also, we cannot be certain that reimbursement policies will not reduce the demand for, or the price paid for, any future products. If reimbursement is not available or is available on a limited basis, we may not be able to successfully commercialize MAT2203, MAT2501 or any other product candidates that we develop.

Unfavorable pricing regulations, third-party reimbursement practices or healthcare reform initiatives could harm our business.

There is increasing pressure on biotechnology companies to reduce healthcare costs. In the U.S., these pressures come from a variety of sources, such as managed care groups, institutional, government purchasers and government leaders. For example, President Trump has indicated support for possible new measures related to drug pricing. Increased purchasing power of entities that negotiate on behalf of federal healthcare programs and private sector beneficiaries could increase pricing pressures in the future. Such pressures may also increase the risk of litigation or investigation by the government regarding pricing calculations. The biotechnology industry will likely face greater regulation and political and legal action in the future.

The regulations that govern marketing approvals, pricing and reimbursement for new therapeutic products vary widely from country to country. Some countries require approval of the sale price of a product before it can be marketed. In many countries, the pricing review period begins after marketing or product licensing approval is granted. In some foreign markets, prescription pharmaceutical pricing remains subject to continuing governmental control even after initial approval is granted. As a result, we might obtain regulatory approval for a product in a particular country, but then be subject to price regulations that delay our commercial launch of the product and negatively impact the revenue we are able to generate from the sale of the product in that country.

Adverse pricing limitations may hinder our ability to recoup our investment in one or more product candidates, even if our product candidates obtain regulatory approval. Adverse pricing limitations prior to approval will also adversely affect us by reducing our commercial potential. Our ability to commercialize any products successfully also will depend in part on the extent to which reimbursement for these products and related treatments becomes available from government health administration authorities, private health insurers and other organizations.

Government authorities and third-party payors, such as private health insurers and health maintenance organizations, decide which medications they will pay for and establish reimbursement levels.

A primary trend in the U.S. healthcare industry and elsewhere is cost containment. Government authorities and these third-party payors have attempted to control costs by limiting coverage and the amount of reimbursement for particular medications. Increasingly, third-party payors are requiring that companies provide them with predetermined discounts from list prices and are challenging the prices charged for medical products. We cannot be sure that coverage and reimbursement will be available for any product that we commercialize and, if reimbursement is available, what the level of reimbursement will be. Reimbursement may impact the demand for, or the price of, any product for which we obtain marketing approval. Obtaining reimbursement for our products may be particularly difficult because of the higher prices often associated with products administered under the supervision of a physician. If reimbursement is not available or is available only to limited levels, we may not be able to successfully commercialize any product candidate that we successfully develop.

There may be significant delays in obtaining reimbursement for approved products, and coverage may be more limited than the purposes for which the product is approved by the FDA or regulatory authorities in other countries. Moreover, eligibility for reimbursement does not imply that any product will be paid for in all cases or at a rate that covers our costs, including research, development, manufacture, sale and distribution. Interim payments for new products, if applicable, may also not be sufficient to cover our costs and may not be made permanent. Payment rates may vary according to the use of the product and the clinical setting in which it is used, may be based on payments allowed for lower cost products that are already reimbursed and may be incorporated into existing payments for other services. Net prices for products may be reduced by mandatory discounts or rebates required by government healthcare programs or private payors and by any future relaxation of laws that presently restrict imports of products from countries where they may be sold at lower prices than in the United States. Third-party payors often rely upon Medicare coverage policy and payment limitations in setting their own reimbursement policies. Our inability to promptly obtain coverage and profitable payment rates from both government funded and private payors for new products that we develop could have a material adverse effect on our operating results, our ability to raise capital needed to commercialize products and our overall financial condition.

Risks Relating to Our Intellectual Property Rights and Regulatory Exclusivity

We depend on certain technologies that are licensed to us. We do not control these technologies and any loss of our rights to them could prevent us from discovering, developing and commercializing our product candidates.

We are highly dependent on our cochleate delivery technology platform which is licensed to us by Rutgers. We do not own the patents that underlie this technology. Our rights to use the technology we license are subject to the negotiation of, continuation of and compliance with the terms of our license agreement with Rutgers. Pursuant to the terms of our license agreement with Rutgers, we control the prosecution, maintenance, or filing of the patents to which we hold licenses, as well as the enforcement of these patents against third parties. However, some of our patents and patent applications were either acquired from another company who acquired those patents and patent applications from yet another company, or are licensed from a third party. Thus, these patents and patent applications were not written by us or our attorneys, and we did not have control over the drafting and prosecution of certain of these patents. The former patent owners and our licensors might not have given the same attention to the drafting and prosecution of these patents and applications as we would have if we had been the owners of the patents and applications and had control over the drafting and prosecution. We cannot be certain that drafting and/or prosecution of the licensed patents and patent applications by the licensors have been or will be conducted in compliance with applicable laws and regulations or will result in valid and enforceable patents and other intellectual property rights.

Our rights to use the technology we license are subject to the validity of the owner's intellectual property rights. Enforcement of our licensed patents or defense or any claims asserting the invalidity of these patents is often subject to the control or cooperation of our licensors. Legal action could be initiated against the owners of the intellectual property that we license and an adverse outcome in such legal action could harm our business because it might prevent such companies or institutions from continuing to license intellectual property that we may need to operate our business. In addition, such licensors may resolve such litigation in a way that benefits them but adversely affects our ability to use the licensed technology for our products.

Certain of our licenses contained in our agreement with Rutgers contain provisions that allow the licensor to terminate the license if (i) we breach any payment obligation or other material provision under the agreement and fail to cure the breach within a fixed time following written notice of termination, (ii) we or any of our affiliates, licensees or sub licensees directly or indirectly challenge the validity, enforceability, or extension of any of the licensed patents or (iii) we declare bankruptcy or dissolve. Our rights under the licenses are subject to our continued compliance with the terms of the license, including the payment of royalties due under the license. Termination of these licenses would prevent us from discovering, developing and commercializing product candidates based on the cochleate delivery technology, including our lead anti-infective product candidate, MAT2203. Determining the scope of the license and related royalty obligations can be difficult and can lead to disputes between us and the licensor. An unfavorable resolution of such a dispute could lead to an increase in the royalties' payable pursuant to the license. If a licensor believed we were not paying the royalties due under the license or were otherwise not in compliance with the terms of the license, the licensor might attempt to revoke the license. If such an attempt were successful, we might be barred from discovering, developing and commercializing product candidates based on the cochleate delivery technology, including our lead anti-infective product candidate.

If we discontinue development of the cochleate delivery technology, we would be required to return such technology to the former stockholders of Aquarius and we would lose the rights to our lead product candidates.

Under certain circumstances, we will be required to transfer Aquarius' cochleate delivery technology back to the former shareholders of Aquarius. This transfer would be required under the Merger Agreement in the event the following conditions are met: (i) no milestone events have occurred on or before the two-year anniversary of the effective time of the Aquarius Merger (the "Transfer Date"), (ii) during such period we shall have discontinued efforts to develop or commercialize the cochleate delivery technology (as conclusively demonstrated by our omission of the cochleate delivery technology in at least two consecutive royalty, progress and payment reports delivered to Rutgers pursuant to the license agreement entered into between Aquarius and Rutgers) and (iii) as of the Transfer Date, no unresolved indemnification claims for us and our indemnified parties are pending. If the foregoing conditions are met, we would transfer the cochleate delivery technology to the stockholder representative or to a newly formed entity as directed by the stockholder representative (in either case for the benefit of the former Aquarius stockholders) following receipt of any necessary third party consents required for the transfer, which we shall use its commercially reasonable efforts to obtain. If we are required to transfer the cochleate delivery technology back to the former shareholders of Aquarius, we would lose our rights to our lead product candidates, which would have a material and adverse effect on our business.

It is difficult and costly to protect our intellectual property rights, and we cannot ensure the protection of these rights.

Our commercial success will depend, in part, on obtaining and maintaining patent protection for our technologies, products and processes, successfully defending these patents against third-party challenges and successfully enforcing these patents against third party competitors. The patent positions of pharmaceutical companies can be highly uncertain and involve complex legal, scientific and factual questions for which important legal principles remain unresolved. Changes in either the patent laws or in interpretations of patent laws may diminish the value of our intellectual property. Accordingly, we cannot predict the breadth of claims that may be allowable or enforceable in our patents (including patents owned and licensed by us). We currently own or have rights to eighteen issued patents relating to our cochleate delivery technology, as well as pending patent applications for our cochleate delivery technology that may never be approved by the United States or foreign patent offices. Furthermore, any patents which may eventually be issued from existing patent applications for any of our technologies, may be challenged, invalidated or circumvented by third parties and might not protect us against competitors with similar products or technologies.

The degree of future protection for our proprietary rights is uncertain, because legal means afford only limited protection and may not adequately protect our rights, permit us to gain or keep our competitive advantage, or provide us with any competitive advantage at all. We cannot be certain that any patent application owned by a third party will not have priority over patent applications filed by us, or that we will not be involved in interference, opposition or invalidity proceedings before the United States or foreign patent offices.

We also rely on trade secrets to protect technology, especially in cases where we believe patent protection is not appropriate or obtainable. However, trade secrets are difficult to protect. While we require employees, academic collaborators, consultants and other contractors to enter into confidentiality agreements, we may not be able to adequately protect our trade secrets or other proprietary or licensed information. Typically, research collaborators and scientific advisors have rights to publish data and information in which we may have rights. If we cannot maintain the confidentiality of our proprietary technology and other confidential information, our ability to receive patent protection and our ability to protect valuable information owned by us may be imperiled. Enforcing a claim that a third-party entity illegally obtained and is using any of our trade secrets is expensive and time consuming, and the outcome is unpredictable. In addition, courts are sometimes less willing to protect trade secrets than patents. Moreover, our competitors may independently develop equivalent knowledge, methods and know-how.

If we fail to obtain or maintain patent protection or trade secret protection for our technologies, third parties could use our proprietary information, which could impair our ability to compete in the market and adversely affect our ability to generate revenues and attain profitability.

We may also develop trademarks to distinguish our products from the products of our competitors. We cannot guarantee that any trademark applications filed by us or our business partners will be approved. Third parties may also oppose such trademark applications, or otherwise challenge our use of the trademarks. In the event that the trademarks we use are successfully challenged, we could be forced to rebrand our products, which could result in loss of brand recognition, and could require us to devote resources to advertising and marketing new brands. Further, we cannot provide assurance that competitors will not infringe the trademarks we use, or that we will have adequate resources to enforce these trademarks.

Our product candidates may infringe the intellectual property rights of others, which could increase our costs and delay or prevent our development and commercialization efforts.

Our success depends in part on avoiding infringement of the proprietary technologies of others. The pharmaceutical industry has been characterized by frequent litigation regarding patent and other intellectual property rights. Identification of third party patent rights that may be relevant to our proprietary technology is difficult because patent searching is imperfect due to differences in terminology among patents, incomplete databases and the difficulty in assessing the meaning of patent claims. Additionally, because patent applications are maintained in secrecy until the application is published, we may be unaware of third-party patents that may be infringed by commercialization of MAT2203, MAT2501 or any future product candidate. There may be certain issued patents and patent applications claiming subject matter that we may be required to license in order to research, develop or commercialize MAT2203 or MAT2501 and we do not know if such patents and patent applications would be available to license on commercially reasonable terms, or at all. Any claims of patent infringement asserted by third parties against us would be time-consuming and may:

- result in costly litigation;
- divert the time and attention of our technical personnel and management;
- prevent us from commercializing a product until the asserted patent expires or is held finally invalid or not infringed in a court of law;
- require us to cease or modify our use of the technology and/or develop non-infringing technology; or
- require us to enter into royalty or licensing agreements.

Although no third party has asserted a claim of infringement against us, others may hold proprietary rights that could prevent MAT2203 or MAT2501 from being marketed. Any patent-related legal action against us claiming damages and seeking to enjoin commercial activities relating to MAT2203 or MAT2501 or our processes could subject us to potential liability for damages and require us to obtain a license to continue to manufacture or market our current product candidates or any future product candidates. We cannot predict whether we would prevail in any such actions or that any license required under any of these patents would be made available on commercially acceptable terms, if at all. In addition, we cannot be sure that we could redesign, MAT2203, MAT2501, or any future product candidates or processes to avoid infringement, if necessary. Accordingly, an adverse determination in a judicial or administrative proceeding, or the failure to obtain necessary licenses, could prevent us from developing and commercializing MAT2203, MAT2501 or a future product candidate, which could harm our business, financial condition and operating results.

We anticipate that competitors may from time to time oppose our efforts to obtain patent protection for new technologies or to submit patented technologies for regulatory approval. Competitors may seek to oppose our patent applications to delay the approval process or to challenge our granted patents, for example, by requesting a reexamination of our patent at the United States Patent and Trademark Office, or the USPTO, or by filing an opposition in a foreign patent office, even if the opposition or challenge has little or no merit. Such proceedings are generally highly technical, expensive and time consuming, and there can be no assurance that such a challenge would not result in the narrowing or complete revocation of any patent of ours that was so challenged.

We may be subject to claims that we have wrongfully hired an employee from a competitor or that we or our employees have wrongfully used or disclosed alleged confidential information or trade secrets of their former employers.

As is commonplace in our industry, we employ individuals who were previously employed at or retained by other pharmaceutical companies, including our competitors or potential competitors. Although no claims against us are currently pending, we may be subject in the future to claims that our employees or prospective employees are subject to a continuing obligation to their former employers (such as non-competition or non-solicitation obligations) or claims that our employees or we have inadvertently or otherwise used or disclosed trade secrets or other proprietary information of their former employers. Litigation may be necessary to defend against these claims. Even if we are successful in defending against these claims, litigation could result in substantial costs and be a distraction to management.

We may not be able to obtain or maintain orphan drug designation or exclusivity for our anti-infective product candidates.

We have obtained orphan drug designation for MAT2501 for the treatment of nontuberculous mycobacteria and may seek orphan drug designation for MAT2203 in the United States and may seek additional orphan drug designation for other product candidates. Regulatory authorities in some jurisdictions, including the United States and Europe, may designate drugs for relatively small patient populations as orphan drugs. Under the Orphan Drug Act, the FDA may designate a product as an orphan drug if it is a drug intended to treat a rare disease or condition, which is generally defined as a patient population of fewer than 200,000 individuals in the United States.

Generally, if a product with an orphan drug designation subsequently receives the first marketing approval for the indication for which it has such designation, the product is entitled to a period of marketing exclusivity, which precludes the FDA or the EMA from approving another marketing application for the same indication for that drug during that time period. The applicable period is seven years in the United States and ten years in Europe. The European exclusivity period can be reduced to six years if a drug no longer meets the criteria for orphan drug designation or if the drug is sufficiently profitable so that market exclusivity is no longer justified. Orphan drug exclusivity may be lost if the FDA or the EMA determines that the request for designation was materially defective or if the manufacturer is unable to assure sufficient quantity of the drug to meet the needs of patients with the rare disease or condition.

We cannot assure you that the application for orphan drug designation of MAT2203, or any future application with respect to any other product candidate, will be granted. If we are unable to obtain orphan drug designation in the United States, we will not be eligible to obtain the period of market exclusivity that could result from orphan drug designation or be afforded the financial incentives associated with orphan drug designation. Even if we obtain orphan drug exclusivity for a product, that exclusivity may not effectively protect the product from competition because different drugs can be approved for the same condition. Even after an orphan drug is approved, the FDA can subsequently approve the same drug for the same condition if the FDA concludes that the later drug is clinically superior in that it is shown to be safer, more effective or makes a major contribution to patient care.

Any fast track designation or grant of priority review status by the FDA may not actually lead to a faster development or regulatory review or approval process, nor will it assure FDA approval of our product candidates. Additionally, our product candidates may treat indications that do not qualify for priority review vouchers.

We have received fast track designation for MAT2203 for the treatment of invasive candidiasis and may seek fast track designation for some of our other product candidates or priority review of applications for approval of our product candidates for certain indications. If a drug is intended for the treatment of a serious or life-threatening condition and the drug demonstrates the potential to address unmet medical needs for this condition, the drug sponsor may apply for FDA fast track designation. If a product candidate offers major advances in treatment, the FDA may designate it eligible for priority review. The FDA has broad discretion whether or not to grant these designations, so even if we believe a particular product candidate is eligible for these designations, we cannot assure you that the FDA would decide to grant them. Even if we do receive fast track designation or priority review, we may not experience a faster development process, review or approval compared to conventional FDA procedures. The FDA may withdraw fast track designation if it believes that the designation is no longer supported by data from our clinical development program.

Any breakthrough therapy designation granted by the FDA for our product candidates may not lead to a faster development or regulatory review or approval process, and it does not increase the likelihood that our product candidates will receive marketing approval.

We may seek a breakthrough therapy designation for some of our product candidates. A breakthrough therapy is defined as a drug that is intended, alone or in combination with one or more other drugs, to treat a serious or life-threatening disease or condition, and preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. For drugs and biologics that have been designated as breakthrough therapies, interaction and communication between the FDA and the sponsor of the trial can help to identify the most efficient path for clinical development while minimizing the number of patients placed in ineffective control regimens. Drugs designated as breakthrough therapies by the FDA may also be eligible for accelerated approval if the relevant criteria are met.

Designation as a breakthrough therapy is within the discretion of the FDA. Accordingly, even if we believe one of our product candidates meets the criteria for designation as a breakthrough therapy, the FDA may disagree and instead determine not to make such designation. In any event, the receipt of a breakthrough therapy designation for a product candidate may not result in a faster development process, review or approval compared to drugs considered for approval under conventional FDA procedures and does not assure ultimate approval by the FDA. In addition, even if one or more of our product candidates qualify as breakthrough therapies, the FDA may later decide that the products no longer meet the conditions for qualification or decide that the time period for FDA review or approval will not be shortened.

Designation of our product candidates as qualified infectious disease products is not assured and, in any event, even if granted, may not actually lead to a faster development or regulatory review, and would not assure FDA approval of our product candidates.

We have received a qualified infectious disease product, or QIDP, designation for MAT2203 and MAT2501 and we may be eligible for designation of certain of our product candidates as QIDPs. A QIDP is “an antibacterial or antifungal drug intended to treat serious or life-threatening infections, including those caused by an antibacterial or antifungal resistant pathogen, including novel or emerging infectious pathogens or certain “qualifying pathogens.” A product designated as a QIDP will be granted priority review by the FDA and may qualify for “fast track” status. Upon the approval of an NDA for a drug product designated by the FDA as a QIDP, the product is granted a period of five years of regulatory exclusivity in addition to any other period of regulatory exclusivity for which the product is eligible. The FDA has broad discretion whether or not to grant these designations, so even if we believe a particular product candidate is eligible for such designation or status, the FDA could decide not to grant it. Moreover, even if we do receive such a designation, we may not experience a faster development process, review or approval compared to conventional FDA procedures and there is no assurance that our product candidate, even if determined to be a QIDP, will be approved by the FDA.

General Company-Related Risks

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

We currently have only ten employees. As our development and commercialization plans and strategies develop, we will need to expand the size of our employee base for managerial, development, operational, sales, marketing, financial and other resources. Future growth would impose significant added responsibilities on members of management, including the need to identify, recruit, maintain, motivate and integrate additional employees. In addition, our management may have to divert a disproportionate amount of its attention away from our day-to-day activities and devote a substantial amount of time to managing these growth activities. Our future financial performance and our ability to commercialize our product candidates and our ability to compete effectively will depend, in part, on our ability to effectively manage any future growth.

If we are not successful in attracting and retaining highly qualified personnel, we may not be able to successfully implement our business strategy. In addition, the loss of the services of certain key employees would adversely impact our business prospects.

If we are not successful in attracting and retaining highly qualified personnel, we may not be able to successfully implement our business strategy. In addition, the loss of the services of certain key employees, including Roelof Rongen, our President and CEO, or Jerome D. Jabbour, our President, or Raphael J. Mannino, our Chief Technology Officer, would adversely impact our business prospects.

Our ability to compete in the highly competitive pharmaceutical industry depends in large part upon our ability to attract highly qualified managerial, scientific and medical personnel. In order to induce valuable employees to remain with us, we intend to provide employees with stock options that vest over time. The value to employees of stock options that vest over time will be significantly affected by movements in our stock price that we will not be able to control and may at any time be insufficient to counteract more lucrative offers from other companies.

Other pharmaceutical companies with which we compete for qualified personnel have greater financial and other resources, different risk profiles, and a longer history in the industry than we do. They also may provide more diverse opportunities and better chances for career advancement. Some of these characteristics may be more appealing to high-quality candidates than what we have to offer. If we are unable to continue to attract and retain high-quality personnel, the rate and success at which we can develop and commercialize product candidates would be limited.

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

We face a potential risk of product liability as a result of the clinical testing of MAT2203, MAT2501 or any future product candidates and will face an even greater risk if we commercialize MAT2203, MAT2501 or any other future product. For example, we may be sued if any product we develop or any material that we use in our products allegedly causes injury or is found to be otherwise unsuitable during product testing, manufacturing, marketing or sale. Any such product liability claims may include allegations of defects in manufacturing, defects in design, a failure to warn of dangers inherent in the product, negligence, strict liability and a breach of warranties. Claims could also be asserted under state consumer protection acts. If we cannot successfully defend ourselves against product liability claims, we may incur substantial liabilities or be required to limit commercialization of MAT2203 or MAT2501. Even successful defense would require significant financial and management resources. Regardless of the merits or eventual outcome, liability claims may result in:

- decreased demand for MAT2203, MAT2501 or any future products that we may develop;
- injury to our reputation;
- withdrawal of clinical trial participants;
- costs to defend the related litigation;
- a diversion of management's time and our resources;
- substantial monetary awards to trial participants or patients;
- product recalls, withdrawals or labeling, marketing or promotional restrictions;
- loss of revenue;
- the inability to commercialize our product candidates; and
- a decline in our stock price.

Our inability to obtain and retain sufficient product liability insurance at an acceptable cost to protect against potential product liability claims could prevent or inhibit the commercialization of products we develop. We have obtained product liability insurance covering our clinical trials in the amount of greater than or equal to \$5 million in the aggregate. Although we will maintain such insurance, any claim that may be brought against us could result in a court judgment or settlement in an amount that is not covered, in whole or in part, by our insurance or that is in excess of the limits of our insurance coverage. Our insurance policies also have various exclusions, and we may be subject to a product liability claim for which we have no coverage. We may have to pay any amounts awarded by a court or negotiated in a settlement that exceed our coverage limitations or that are not covered by our insurance, and we may not have, or be able to obtain, sufficient capital to pay such amounts.

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

Despite the implementation of security measures, our internal computer systems and those of our CROs and other contractors and consultants are vulnerable to damage or disruption from computer viruses, software bugs, unauthorized access, natural disasters, terrorism, war, and telecommunication, equipment and electrical failures. While we have not, to our knowledge, experienced any significant system failure, accident or security breach to date, if such an event were to occur and cause interruptions in our operations, it could result in a material disruption of our programs. For example, the loss of clinical trial data from completed or ongoing clinical trials for any of our product candidates could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. To the extent that any disruption or security breach results in a loss of or damage to our data or applications, or inappropriate disclosure or theft of confidential or proprietary information, we could incur liability, the further development of our product candidates could be delayed, our competitive position could be compromised, or our business reputation could be harmed.

We may acquire businesses or products, or form strategic alliances, in the future, and we may not realize the benefits of such acquisitions.

We may acquire additional businesses or products, form strategic alliances or create joint ventures with third parties that we believe will complement or augment our existing business. If we acquire businesses with promising markets or technologies, we may not be able to realize the benefit of acquiring such businesses if we are unable to successfully integrate them with our existing operations and company culture. We may encounter numerous difficulties in developing, manufacturing and marketing any new products resulting from a strategic alliance or acquisition that delay or prevent us from realizing their expected benefits or enhancing our business. We cannot assure you that, following any such acquisition, we will achieve the expected synergies to justify the transaction.

Risks related to our Securities

Pursuant to the terms of our outstanding Series A Preferred Stock, we may be obligated to pay significant royalties.

Pursuant to the terms of the Certificate of Designations of Preferences, Rights and Limitations (the "Certificate of Designations") for our outstanding Series A Preferred Stock, we may be required to pay royalties of up to \$35 million per year. If and when we obtain FDA or EMA approval of MAT2203 and/or MAT2501, which we do not expect to occur before 2020, if ever, and/or if we generate sales of such products, or we receive any proceeds from the licensing or other disposition of MAT2203 or MAT2501, we are required to pay to the holders of our Series A Preferred Stock, subject to certain vesting requirements, in aggregate, a royalty equal to (i) 4.5% of Net Sales (as defined in the Certificate of Designations), subject in all cases to a cap of \$25 million per calendar year, and (ii) 7.5% of Licensing Proceeds (as defined in the Certificate of Designations), subject in all cases to a cap of \$10 million per calendar year. The Royalty Payment Rights will expire when the patents covering the applicable product expire, which is currently expected to be in 2033.

We are obligated to pay dividends on outstanding shares of our Series A Preferred Stock.

Holders of Series A Preferred Stock are entitled to receive cumulative dividends at the rate per share of 8% per annum, payable in shares of our common stock, which annual dividend will accumulate until such time as the shares of Series A Preferred Stock are converted, at which time the accumulated dividend will be satisfied by delivery of shares of common stock at a price per share of common stock equal to the conversion price of the Series A Preferred Stock then in effect (currently \$0.50 per share). The Series A Preferred Stock will automatically convert at the conversion price in effect on July 29, 2019, unless such shares are converted earlier in accordance with the terms of the Certificate of Designations for the Series A Preferred Stock. The payment of such dividends will result in additional dilution to our holders of our common stock.

Our Series A Preferred Stock has certain preference rights upon any liquidation, dissolution or winding up.

Upon any dissolution, liquidation or winding up, whether voluntary or involuntary, holders of Series A Preferred Stock will be entitled to (i) first receive distributions out of our assets in an amount per share equal to \$5.00, or the stated value, plus all accrued and unpaid dividends, whether capital or surplus before any distributions shall be made on any shares of common stock and (ii) second, receive distributions out of our assets on an as-converted basis alongside the common stock.

We do not intend to pay dividends on our common stock in the foreseeable future.

The Board of Directors will determine, in its sole discretion, our dividend policy after considering our financial condition, results of operations and capital requirements, as well as other factors. No dividends may be declared or paid on our common stock, unless a dividend, payable in the same consideration or manner, is simultaneously declared or paid, as the case may be, on the shares of Series A Preferred Stock. We do not anticipate paying cash dividends on our common stock in the foreseeable future and you should not invest in us with the anticipation of receiving dividend income.

There has been a limited trading market for our common stock and there has been limited market activity to date.

Our common stock was listed on the NYSE MKT under the symbol "MTNB" on March 2, 2017. Prior to March 2, 2017, our common stock was available for quotation on the OTCQB under the symbol "MTNB." There has been limited market activity to date. A lack of an active market may impair your ability to sell shares of our common stock at the time you wish to sell them or at a price that you consider reasonable. An inactive market may also impair our ability to raise capital by selling shares of capital stock and may impair our ability to acquire other companies or technologies by using our common stock as consideration.

Our share price has been and could remain volatile.

The market price of our common stock has historically experienced and may continue to experience significant volatility. From January 1, 2015 through March 15, 2017, the market price of our common stock has fluctuated from a high of \$3.99 per share to a low of

\$0.34 per share. Our progress in developing our product candidates, the impact of government regulations on our products and industry, the potential sale of a large volume of our common stock by stockholders, our quarterly operating results, changes in general conditions in the economy or the financial markets and other developments affecting us or our competitors could cause the market price of our common stock to fluctuate substantially with significant market losses. If our stockholders sell a substantial number of shares of common stock, especially if those sales are made during a short period of time, those sales could adversely affect the market price of our common stock and could impair our ability to raise capital. In addition, in recent years, the stock market has experienced significant price and volume fluctuations. This volatility has affected the market prices of securities issued by many companies for reasons unrelated to their operating performance and may adversely affect the price of our common stock. In addition, we could be subject to a securities class action litigation as a result of volatility in the price of our stock, which could result in substantial costs and diversion of management's attention and resources and could harm our stock price, business, prospects, results of operations and financial condition.

We are an “emerging growth company,” and we intend to take advantage of reduced disclosure requirements applicable to “emerging growth companies,” which could make our common stock less attractive to investors.

We are an “emerging growth company,” as defined in the Jumpstart Our Business Startups Act of 2012, or JOBS Act, and, for as long as we continue to be an “emerging growth company,” we intend to take advantage of certain exemptions from various reporting requirements applicable to other public companies but not to “emerging growth companies,” including, but not limited to, not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements, and exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved. We could be an “emerging growth company” until December 31, 2019, or until the earliest of (i) the last day of the first fiscal year in which our annual gross revenues exceed \$1 billion, (ii) the date that we become a “large accelerated filer” as defined in Rule 12b-2 under the Exchange Act, which would occur if the market value of our common stock that is held by non-affiliates exceeds \$700 million as of the last business day of our most recently completed second fiscal quarter, or (iii) the date on which we have issued more than \$1 billion in non-convertible debt during the preceding three year period. We cannot predict if investors will find our common stock less attractive if we choose to continue to rely on these exemptions. If some investors find our common stock less attractive as a result of any choices to reduce future disclosure, there may be a less active trading market for our common stock and our stock price may be more volatile.

We are incurring significantly increased costs and devote substantial management time as a result of operating as a public company, which costs may increase after we are no longer an “emerging growth company.”

As a public company, we are incurring significant legal, accounting and other expenses. For example, we are required to comply with certain of the requirements of the Sarbanes-Oxley Act and the Dodd-Frank Wall Street Reform and Consumer Protection Act, as well as rules and regulations subsequently implemented by the SEC, including the establishment and maintenance of effective disclosure and financial controls and changes in corporate governance practices. Compliance with these requirements have resulted in increased legal and financial compliance costs. In addition, our management and other personnel must divert attention from operational and other business matters to devote substantial time to these public company requirements. In particular, we are incurring significant expenses and devote substantial management effort toward ensuring compliance with the requirements of Section 404 of the Sarbanes-Oxley Act.

However, for as long as we remain an “emerging growth company” as defined in the JOBS Act, we intend to take advantage of certain exemptions from various reporting requirements that are applicable to other public companies that are not “emerging growth companies” including, but not limited to, not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements, and exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved. We intend to take advantage of these reporting exemptions until we are no longer an “emerging growth company.”

Under the JOBS Act, “emerging growth companies” can delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have irrevocably elected not to avail ourselves of this exemption from new or revised accounting standards and, therefore, we will be subject to the same new or revised accounting standards as other public companies that are not “emerging growth companies.”

After we are no longer an “emerging growth company” and if we are no longer a smaller reporting company at such time, we expect to incur additional management time and cost to comply with the more stringent reporting requirements applicable to companies that are deemed accelerated filers or large accelerated filers, including complying with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act.

We cannot predict or estimate the amount of additional costs we may incur as a result of becoming a public company or the timing of such costs.

Failure to build our finance infrastructure and improve our accounting systems and controls could impair our ability to comply with the financial reporting and internal control requirements for publicly traded companies.

As a public company, we operate in an increasingly demanding regulatory environment, which requires us to comply with applicable provisions of the Sarbanes-Oxley Act, and the related rules and regulations of the SEC, expanded disclosure requirements, accelerated reporting requirements and more complex accounting rules. Company responsibilities required by the Sarbanes-Oxley Act include establishing corporate oversight and adequate internal control over financial reporting and disclosure controls and procedures. Effective internal controls are necessary for us to produce reliable financial reports and are important to help prevent financial fraud.

We rely on consultants to perform certain of our accounting and financial reporting functions. We will need to hire additional finance personnel and build our financial infrastructure as we comply with public company reporting requirements, including complying with the applicable requirements of Section 404 of the Sarbanes-Oxley Act. We may be unable to do so on a timely basis.

Moreover, we do not expect that disclosure controls or internal control over financial reporting will prevent all error and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control system's objectives will be met. Further, the design of a control system must reflect the fact that there are resource constraints and the benefits of controls must be considered relative to their costs. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected. Failure of our control systems to prevent error or fraud could materially adversely impact us.

Upon dissolution of our company, you may not recoup all or any portion of your investment.

In the event of a liquidation, dissolution or winding-up of our company, whether voluntary or involuntary, the proceeds and/or assets of our company remaining after giving effect to such transaction, and the payment of all of our debts and liabilities will be distributed first to the holders of our Series A Preferred Stock and thereafter to the stockholders of common stock (including the holders of our Series A Preferred Stock on an "as converted" basis) 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 of our Company. In this event, you could lose some or all of your investment.

Our certificate of incorporation allows for our board to create new series of preferred stock without further approval by our stockholders, which could adversely affect the rights of the holders of our common stock.

Our board of directors has the authority to fix and determine the relative rights and preferences of preferred stock. We anticipate that our board of directors will have the authority to issue up to 8,400,000 additional shares of our preferred stock without further stockholder approval. As a result, our board of directors could authorize the issuance of a series of preferred stock that would grant to holders the preferred right to our assets upon liquidation, the right to receive dividend payments before dividends are distributed to the holders of common stock and the right to the redemption of the shares, together with a premium, prior to the redemption of our common stock. In addition, our board of directors could authorize the issuance of a series of preferred stock that has greater voting power than our common stock or that is convertible into our common stock, which could decrease the relative voting power of our common stock or result in dilution to our existing stockholders.

Anti-takeover provisions of our certificate of incorporation, our bylaws and Delaware law could make an acquisition of us, which may be beneficial to our stockholders, more difficult and may prevent attempts by our stockholders to replace or remove the current members of our board and management.

Certain provisions of our amended and restated certificate of incorporation and bylaws could discourage, delay or prevent a merger, acquisition or other change of control that stockholders may consider favorable, including transactions in which you might otherwise receive a premium for your Shares. Furthermore, these provisions could prevent or frustrate attempts by our stockholders to replace or remove members of our board of directors. These provisions also could limit the price that investors might be willing to pay in the future for our common stock, thereby depressing the market price of our common stock. Stockholders who wish to participate in these transactions may not have the opportunity to do so. These provisions, among other things:

- they provide that special meetings of stockholders may be called only by the board of directors, President or our Chairman of the Board of Directors, or at the request in writing by stockholders of record owning at least fifty (50%) percent of the issued and outstanding voting shares of common stock;
- they do not include a provision for cumulative voting in the election of directors. Under cumulative voting, a minority stockholder holding a sufficient number of shares may be able to ensure the election of one or more directors. The absence of cumulative voting may have the effect of limiting the ability of minority stockholders to effect changes in our board of directors; and
- they allow us to issue, without stockholder approval, up to 10,000,000 shares of preferred stock (of which up to 8,400,000 shares remain available for issuance) that could adversely affect the rights and powers of the holders of our common stock.

In addition, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, or DGCL, which may, unless certain criteria are met, prohibit large stockholders, in particular those owning 15% or more of the voting rights on our common stock, from merging or combining with us for a prescribed period of time.

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

As a result of the 2013 Merger (as defined herein), our ability to utilize our U.S. federal net operating loss, carryforwards and U.S. federal tax credits may be limited under Sections 382 of the Internal Revenue Code of 1986, as amended. The limitations apply if an “ownership change,” as defined by Section 382 and Section 383, occurs. Generally, an ownership change occurs if the percentage of the value of the stock that is owned by one or more direct or indirect “five percent shareholders” increases by more than 50 percentage points over their lowest ownership percentage at any time during the applicable testing period (typically three years). In addition, future changes in our stock ownership, which may be outside of our control, may trigger an “ownership change” and, consequently, Section 382 and Section 383 limitations. As a result, if we earn net taxable income, our ability to use our pre-change net operating loss carryforwards and other tax attributes to offset U.S. federal taxable income may be subject to limitations, which could potentially result in increased future tax liability to us.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties**Facilities**

Our administrative offices consist of approximately 5,900 square feet of office space in Bedminster, NJ that we occupy under a lease that expires in May 2021. We also lease laboratory space approximating 14,000 square feet in Bridgewater, NJ, that expires in 2027.

Item 3. Legal Proceedings

We are not currently a party to any legal proceedings and we are not aware of any claims or actions pending or threatened against us. In the future, we might from time to time become involved in litigation relating to claims arising from our ordinary course of business.

Item 4. Mine Safety Disclosures

Not applicable

PART II**Item 5. Market For Registrant's Common Equity, Related Stockholder Matters And Issuer Purchases Of Equity Securities**

Prior to July 21, 2014, no public trades occurred in our common stock. On July 21, 2014, our common stock commenced quotation on the OTCQB under the symbol "MTNB". The following table sets forth, for the periods indicated, the reported high and low bid quotations per share for our common stock based on information provided by the OTC Market Group, Inc. Such OTCQB over-the-counter market quotations reflect inter-dealer prices, without markup, markdown or commissions and, particularly because our common stock is traded infrequently, may not necessarily represent actual transactions or a liquid trading market. Subsequent to December 31, 2016, our common stock was listed on NYSE MKT effective March 2, 2017.

	Fiscal Year 2015	
	High	Low
First Quarter	\$ 0.65	\$ 0.34
Second Quarter	\$ 1.42	\$ 0.60
Third Quarter	\$ 1.05	\$ 0.73
Fourth Quarter	\$ 0.91	\$ 0.60

	Fiscal Year 2016	
	High	Low
First Quarter	\$ 0.90	\$ 0.45
Second Quarter	\$ 0.79	\$ 0.47
Third Quarter	\$ 1.73	\$ 0.61
Fourth Quarter	\$ 1.95	\$ 1.25

 Holders

As of March 15, 2017, we had approximately 460 record holders of our common stock. The number of record holders was determined from the records of our transfer agent and does not include beneficial owners of common stock whose shares are held in the names of various security brokers, dealers, and registered clearing agencies. VStock Transfer, LLC is the transfer agent and registrar for our common stock.

Dividends

We have never paid or declared any cash dividends on our common stock, and we do not anticipate paying any cash dividends on our common stock in the foreseeable future. We intend to retain all available funds and any future earnings to fund the development and expansion of our business. Any future determination to pay dividends will be at the discretion of our board of directors and will depend upon a number of factors, including our results of operations, financial condition, future prospects, contractual restrictions, restrictions imposed by applicable law and other factors our board of directors deems relevant.

Item 6. Selected Financial Data

Per §229.301 of Regulation S-K, the Company, designated a Smaller Reporting Company as defined in Section §229.10(f)(1) of Regulation S-K, is not required to provide selected financial data. Management's Discussion and Analysis of Financial Condition and Results of Operations is intended to help the reader understand the results of operations and financial condition of the Company and should be read in conjunction with our audited consolidated financial statements and notes thereto for the year ended December 31, 2016.

Item 7. Management's Discussion And Analysis Of Financial Condition And Results Of Operations

The following discussion and analysis of our financial condition and results of operations should be read together with our financial statements and related notes appearing elsewhere in this Annual Report on Form 10-K. Some of the information contained in this discussion and analysis or set forth elsewhere in this Annual Report on Form 10-K, including information with respect to our plans and strategy for our business and financing needs, includes forward-looking statements that involve risks and uncertainties and should be read together with the "Risk Factors" section of this Annual Report on Form 10-K for a discussion of important factors that could cause actual results to differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis. Our actual results could differ materially from those anticipated in these forward-looking statements as a result of various factors, including those discussed below and elsewhere in this Annual Report and in other reports we file with the Securities and Exchange Commission, particularly those under "Risk Factors." Dollars in tabular format are presented in thousands, except per share data, or otherwise indicated.

Overview

We are a clinical-stage biopharmaceutical company focused on developing innovative anti-infectives for orphan indications. Our product and development candidates are derived using our unique and proprietary lipid-crystal nano-particle, or cochleate, formulation platform delivery technology. Our proprietary cochleate delivery technology platform, licensed from Rutgers University on an exclusive worldwide basis, nano-encapsulates drugs and is designed to make these drugs orally bioavailable, well tolerated and safer and less toxic while providing targeted and safe delivery of pharmaceuticals directly to the site of infection or inflammation. We believe our cochleate technology provides us with an efficient and broadly applicable drug delivery platform, with particular utility in diseases and conditions in which the immune system plays a significant modulation role and where the immune system facilitates the active transport of our lipid crystal nano-particles throughout the body.

Currently, we are focused on the anti-infective market and on drug candidates which we believe demonstrate the value and innovation associated with our unique cochleate delivery platform technology while potentially providing significant health economic benefit to the health care system. We believe initially focusing on the anti-infective market has distinct advantages for the development of products which meet significant unmet medical need, including:

- a current regulatory environment which provides small development and clinical stage companies incentives such as significant periods of regulatory marketing exclusivity and opportunities to reduce development cost and timeline to market for anti-infective drug candidates;

- traditional high correlation between efficacy and safety data in preclinical animal models and the outcome of human clinical trials with anti-infective product candidates;
- attractive commercial opportunities for anti-infective product differentiated in safety profile, mode of action and oral bioavailability positioned against current therapies with significant side effects, or drug to drug interactions, limited efficacy and intravenous delivery resulting in lack of convenience, compliance and at a significant burden to the cost of healthcare; and
- an ability to commercialize anti-infective products with a focused and cost-efficient sales and marketing organization.

MAT2203 and MAT2501

We leveraged our platform cochleate delivery technology to develop two clinical-stage products that we believe have the potential to become best-in-class drugs. Our lead product candidate MAT2203 is an orally-administered cochleate formulation of a broad spectrum anti-fungal drug called amphotericin B. We are initially developing MAT2203 for the treatment of serious fungal infections as well as the prevention of invasive fungal infections (IFIs) due to immunosuppressive therapy. We are currently conducting two Phase 2 clinical trials involving MAT2203 and expect to report interim results from our open label NIH run Phase 2a clinical trial and topline results from our ongoing Phase 2 study of MAT2203 in Vulvovaginal Candidiasis in the first half of 2017.

Our second clinical stage product candidate is MAT2501, an orally administered, encochleated formulation of the broad spectrum aminoglycoside antibiotic amikacin which may be used to treat different types of multidrug-resistant bacteria, including non-tuberculous mycobacterium infections (NTM), as well as various multidrug-resistant gram negative and intracellular bacterial infections. We recently completed and announced topline results from a Phase 1 single escalating dose clinical trial of MAT2501 in healthy volunteers in which no serious adverse events were reported and where oral administration of MAT2501 at all tested doses yielded blood levels that were well below the safety levels recommended for injected amikacin, supporting further development of MAT2501 for the treatment of NTM infections.

We are a development stage company and have generated \$0.2 million in contract research revenues during 2015. These contract research revenues ended during 2015 and we did not generate revenues during 2016. We have incurred losses for each period from inception. Our net loss was approximately \$7.6 million and \$9.1 million for the fiscal years ended December 31, 2016 and 2015, respectively. We expect to incur significant expenses and increasing operating losses for the foreseeable future. We expect our expenses to increase significantly in connection with our ongoing activities to develop, seek regulatory approval and commercialization of MAT2203 and MAT2501 and any other product candidates we choose to develop based upon our platform technology. Accordingly, we will need additional financing to support our long term continuing operations. We will seek to fund our operations through public or private equity or debt financings or other sources, which may include collaborations with third parties. Adequate additional financing may not be available to us on acceptable terms, or at all. Our failure to raise capital as and when needed would impact our going concern and would have a negative impact on our financial condition and our ability to pursue our business strategy and continue as a going concern. We will need to generate significant revenues to achieve profitability, and we may never do so.

Financial Operations Overview

Revenue

During the year ended December 31, 2015, we generated \$0.2 million in contract research revenues, resulting from the acquisition of Aquarius. No revenues were generated for the year ended December 31, 2016. Our ability to generate product revenue from our lead clinical product candidates, if approved, which we do not expect to occur before 2021, if ever, will depend significantly on the successful development and eventual commercialization of MAT2203 and MAT2501.

Research and Development Expenses

Research and development expenses consist of costs incurred for the development of MAT2203 and MAT2501 and, to a much lesser extent, MAT9001, which include:

- the cost of conducting pre-clinical work;
- the cost of acquiring, developing and manufacturing pre-clinical and human clinical trial materials;
- costs for consultants and contractors associated with Chemistry and Manufacturing Controls (CMC), pre-clinical and clinical activities and regulatory operations;
- expenses incurred under agreements with contract research organizations, or CROs, including the National Institutes of Health (NIH), that conduct our pre-clinical or clinical trials; and
- employee-related expenses, including salaries and stock-based compensation expense for those employees involved in the research and development process.

The table below summarizes our direct research and development expenses for our product candidates for the years ended December 31, 2016 and 2015. Our direct research and development expenses consist principally of external costs, such as fees paid to contractors, consultants, analytical laboratories and CROs and/or the NIH, in connection with our development work. We typically use our employee and infrastructure resources for manufacturing clinical trial materials, conducting product analysis, study protocol development and overseeing outside vendors. Included in "Internal Staffing, Overhead and Other" below is the cost of laboratory space, supplies, R&D employee costs (including stock option expenses), travel and medical education.

	Year Ended December 31,	
	2016	2015
	(\$ in thousands)	
Direct research and development expenses:		
Manufacturing process development	\$ 152	\$ 419
Preclinical trials	148	310
Clinical development	1,190	1,406
Regulatory	186	353
Internal staffing, overhead and other	2,272	2,804
Total research & development	\$ 3,948	\$ 5,292

Research and development activities are central to our business model. We expect our research and development expenses to increase because product candidates in later stages of clinical development generally have higher development costs than those in earlier stages of clinical development, primarily due to the increased size and duration of later-stage human trials. During 2017, we will be focused on completion of our two Phase II studies for MAT2203, starting a new study, and moving MAT2501 forward in development.

General and Administrative Expenses

General and administrative expenses consist principally of salaries and related costs for personnel in executive and finance functions. Other general and administrative expenses include facility costs, insurance, investor relations expenses, professional fees for legal, patent review, consulting and accounting/audit services.

We anticipate that our general and administrative expenses will increase during 2017 due to the increased expenses related to our status as a publicly traded company, including expenses in support of compliance with the requirements of Section 404 of the Sarbanes Oxley Act as well as increase investor relations, protection of our intellectual property and insurance costs

Sale of Net Operating Losses (NOLs)

Constitutes income obtained from selling unused net operating losses (NOLs) and unused research tax credits under the New Jersey Technology Business Tax Certificate Program.

Other Income (expense), net

Other income and expense, net is largely comprised of interest income/ (expense) and franchise taxes.

Application of Critical Accounting Policies

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

Our significant accounting policies are described in more detail in the notes to our financial statements appearing elsewhere in this Annual Report. We believe the following accounting procedures to be most critical to the judgments and estimates used in the preparation of our financial statements.

Accrued Research and Development Expenses

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

- fees paid to contractors in connection with the development of manufacturing processes for products in development;
- fees paid to CROs in connection with preclinical and clinical development activities;
- fees paid to contractors in connection with preparation of regulatory submissions; and
- fees paid to vendors related to product manufacturing, development and distribution of clinical study supplies.

We base our expenses related to pre-clinical and human studies on our estimates of the services received and efforts expended pursuant to contracts with multiple development contractors that conduct and manage development work and studies on our behalf. The financial terms of these agreements are subject to negotiation, vary from contract to contract and may result in uneven payment flows. There may be instances in which payments made to our vendors will exceed the level of services provided and result in a prepayment of the clinical expense. Payments under some of these contracts may depend on factors such as the successful enrollment of subjects and the completion of specific study milestones. In accruing service fees, we will estimate the time period over which services will be performed, the completion of certain tasks, enrollment of subjects, study center activation and the level of effort to be expended in each period. If the actual timing of the performance of services or the level of effort varies from our estimate, we will adjust the accrual or prepayment accordingly. Although we do not expect our estimates to be materially different from amounts actually incurred, our understanding of the status and timing of services performed relative to the actual status and timing of services performed may vary and may result in us reporting amounts that are too high or too low in any particular period. Based on limited historical experience, actual results have not been materially different from our estimates.

Identifiable Intangible Assets

Identifiable intangible assets are measured at their respective fair values and are not amortized until commercialization. Once commercialization occurs, these intangible assets will be amortized over their estimated useful lives. The fair values assigned to our intangible assets are based upon reasonable estimates and assumptions given available facts and circumstances. Unanticipated events or circumstances may occur that may require us to review the assets for impairment. Events or circumstances that may require an impairment assessment include negative clinical trial results, material delays in our development program or sustained decline in market capitalization.

Indefinite-lived intangible assets are not subject to periodic amortization. Rather, indefinite-lived intangibles are reviewed for impairment by applying a fair value based test on an annual basis or more frequently if events or circumstances indicate impairment may have occurred. Events or circumstances that may require an interim impairment assessment are consistent with those described below. We perform our annual impairment test in December of each year.

Research and Development Expenses

Research and development expenses are charged to operations as they are incurred.

Stock-Based Compensation

Option Grants

We account for all share-based compensation payments issued to employees, directors, and non-employees using an option pricing model for estimating fair value. Accordingly, share-based compensation expense is measured based on the estimated fair value of the awards on the date of grant, net of forfeitures. We recognize compensation expense for the portion of the award that is ultimately expected to vest over the period during which the recipient renders the required services to us using the straight-line single option method. In accordance with authoritative guidance, we re-measure the fair value of non-employee share-based awards as the awards vest, and recognize the resulting value, if any, as expense during the period the related services are rendered.

Significant Factors, Assumptions and Methodologies Used in Determining Fair Value

We apply the fair value recognition provisions of ASC Topic 718, *Compensation-Stock Compensation*, which we refer to as ASC 718. We recognize share-based compensation expense ratably over the requisite service period, which in most cases is the vesting period of the award. Calculating the fair value of share-based awards requires that we make highly subjective assumptions.

We use the Black-Scholes option pricing model to value our stock option awards. Use of this valuation methodology requires that we make assumptions as to the volatility of our common stock, the expected term of our stock options, the risk free interest rate for a period that approximates the expected term of our stock options and our expected dividend yield. As a publicly-held company with a limited operating history, we utilized data from a representative group of companies to estimate expected stock price volatility. We selected companies from the biopharmaceutical industry with similar characteristics to us, including those in the early stage of product development and with a therapeutic focus.

We use the simplified method as prescribed by the Securities and Exchange Commission Staff Accounting Bulletin No. 107, *Share-Based Payment*, to calculate the expected term of stock option grants to employees as we do not have sufficient historical exercise data to provide a reasonable basis upon which to estimate the expected term of stock options granted to employees.

We recognize compensation expense for stock option awards on a straight-line basis over the applicable service period of the award. The service period is generally the vesting period, with the exception of options granted subject to a consulting agreement, whereby the option vesting period and the service period defined pursuant to the terms of the consulting agreement may be different. Stock options issued to consultants are revalued quarterly until fully vested, with any change in fair value expensed. For awards subject to performance conditions, the Company recognizes stock-based compensation expense using the accelerated attribution recognition method when it is probable that the performance condition will be achieved. The following range of assumptions were used to value options granted for the years ended December 31, 2016 and 2015 and to re-measure stock options issued to consultants.

	For the Year Ended December 31,	
	2016	2015
Volatility	44.72 % - 89.15%	71.0% - 102.3%
Risk-free interest rate	1.14 % - 2.09%	1.34% - 1.74%
Dividend yield	0.0%	0.0%
Expected life	6.0 years	6.0 years

The expected stock price volatility assumption was determined by examining the historical volatilities for industry peers, as we have limited trading history for our common stock. We will continue to analyze the historical stock price volatility and expected term assumptions as more historical data for our common stock becomes available. The risk-free interest rate assumption is based on the U.S. Treasury instruments whose term was consistent with the expected term of our stock options. The expected dividend assumption is based on our history and expectation of dividend payouts.

We have never paid dividends on our common stock and do not anticipate paying dividends on our common stock in the foreseeable future. Accordingly, we have assumed no dividend yield for purposes of estimating the fair value of our share-based compensation.

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

Share-based compensation expense associated with stock options, restricted stock granted to employees and non-employees was \$1.5 million for 2016 and \$1.6 million for 2015. As of December 31, 2016, we had \$0.7 million of total unrecognized share-based compensation expense, which we expect to recognize over a weighted-average remaining vesting period of approximately 0.6 years. In future periods, our share-based compensation expense is expected to increase as a result of recognizing our existing unrecognized share-based compensation for awards that will vest and as we issue additional share-based awards to attract and retain our employees.

The closing price of our stock (on the date of a grant) is used as an input in the measurement of stock-based compensation.

We estimated the forfeiture rate at the time of grant and, if necessary, revised in subsequent periods if actual forfeitures differed from those estimates. Forfeitures were estimated based on management's expectation through industry knowledge and historical data.

The 2013 Equity Compensation Plan, as amended, or the Plan, is the only active plan pursuant to which options to acquire common stock or restricted stock awards can be granted and are currently outstanding. As of December 31, 2016, there were 2,503,519 shares of our common stock available for issuance under the Plan.

As of December 31, 2016, we had outstanding options to purchase an aggregate of 8,291,000 shares of our common stock with a weighted average exercise price of \$0.85. At December 31, 2016, 6,445,860 options had vested at a weighted average exercise price of \$0.94 per share. The computation of the aggregate intrinsic value is based upon the difference between the original exercise price of the options and our estimate of the deemed fair value of our common stock at December 31, 2016. The total intrinsic value of options outstanding and vested at December 31, 2016 was \$4.6 million.

Basic and Diluted Net Loss Per Share of common stock

We compute basic net loss per share of common stock by dividing net loss applicable to common stockholders by the weighted-average number of shares of common stock outstanding during the period, excluding the dilutive effects stock options. We compute diluted net loss per share of common stock by dividing the net loss applicable to common stockholders by the sum of the weighted-average number of shares of common stock outstanding during the period plus the potential dilutive effects stock options outstanding during the period calculated in accordance with the treasury stock method, but such items are excluded if their effect is anti-dilutive. Because the impact of these items is anti-dilutive during periods of net loss, there was no difference between our basic and diluted net loss per share of common stock for the years ended December 31, 2016 and 2015.

Emerging Growth Company Status

Under Section 107(b) of the Jumpstart Our Business Startups Act of 2012, emerging growth companies can delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have irrevocably elected not to avail ourselves of this exemption from new or revised accounting standards and, therefore, we will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

Results of Operations

Comparison of Years Ended December 31, 2016 and 2015

	Year Ended December 31,		Increase (Decrease)
	2016	2015	
	(In thousands)		
Expenses:			
Research and development	\$ 3,948	\$ 5,292	\$ (1,344)
General and administrative	4,309	4,814	(505)
Operating Expenses	<u>\$ 8,257</u>	<u>\$ 10,106</u>	<u>\$ (1,849)</u>

Research and Development expenses. Research and Development (R&D) expense for the year ended December 31, 2016 was \$3.9 million, compared to \$5.3 million for the year ended December 31, 2015, a decrease of \$1.4 million. R&D expenses decreased mainly due to the completion of a clinical human study in 2015 for MAT9001. In 2016, significant resources have been targeted to MAT2301 and MAT2501, limiting resources spent on MAT9001. We expect R&D expenses to increase during 2017 as we move our development programs forward, increase our headcount and finance our new laboratory and manufacturing facility.

General and Administrative expenses. General and administrative expense for the year ended December 31, 2016 was \$4.3 million compared to \$4.8 million for the year ended December 31, 2015, a decrease of \$0.5 million. The decrease in general and administrative expense was primarily due to decreases in employee compensation, legal and accounting fees. We forecast increases in these areas in 2017 mainly related to expenses associated with being a public company on a national stock exchange.

Sources of Liquidity

We have funded our operations since inception through private placements of our preferred stock and our common stock and common stock warrants. As of December 31, 2016, we have raised a total of \$27.9 million in net proceeds from sales of our equity securities.

As of December 31, 2016, we had cash totaling \$4.1 million. As detailed in our subsequent event note, in January 2017 we completed a warrant tender offer, which raised approximately \$12.7 million in net proceeds.

2016 Private Placement

In July, August and September 2016, we conducted closings for a private placement, or the "2016 Private Placement," pursuant to which we sold to accredited investors an aggregate of 1,600,000 Series A Preferred Shares, which are convertible into 16,000,000 shares of common stock based on the current conversion price, at a purchase price of \$5.00 per share, for aggregate gross proceeds to the Company of \$8.0 million (see note G for additional information about Preferred Stock). Net proceeds were approximately \$6.8 million after legal and placement agent fees.

2015 Private Placement

In March and April 2015, we completed the 2015 Private Placement which is detailed in our Financial Statement footnotes (Note E), under which we sold an aggregate of 20,000,000 shares of our common stock and warrants to purchase an aggregate of 20,000,000 shares of our common stock with an exercise price of \$0.75 per share, which warrants are exercisable for a period of five years from the initial closing date. Aegis Capital Corp. acted as the Placement Agent for the 2015 Private Placement (the "Placement Agent"). The gross proceeds to us from the 2015 Private Placement were \$10.0 million.

Cash Flows

The following table sets forth the primary sources and uses of cash for each of the period set forth below:

	Year Ended December 31	
	2016	2015
Cash used in operating activities	\$ (6,119)	\$ (7,815)
Cash used in investing activities	-	(5)
Cash provided by financing activities	6,997	8,456
Net increase in cash and cash equivalents	\$ 878	\$ 636

Operating Activities

We have incurred significant costs in the area of research and development, including clinical, manufacturing, analytical, regulatory and other development costs. In addition, general and administrative expenses are incurred related to becoming a public company, personnel costs in the Finance and Executive area, as well as costs associated with legal and patent review. Net cash used in operating activities was approximately \$6.1 million for the year ended December 31, 2016 and \$7.8 million for the year ended December 31, 2015. We expect that there will be a significant increase in cash used in our research and development activities during 2017 as we continue to move our product candidates forward in their development cycle, add R&D headcount and establish our new laboratory and manufacturing facility

Investing Activities

No cash was spent on investing activities for the year ended December 31, 2016. For the year ended December 31, 2015, \$5,000 was spent, primarily for the purchase of scientific laboratory equipment. During 2017, we plan to invest approximately \$1 million in our new R&D and manufacturing facilities.

Financing Activities

Net cash provided by financing activities was \$7.0 million for the year ended December 31, 2016 and \$ 8.5 million for the year ended December 31, 2015. The cash provided by financing activities in 2016 was primarily due to the \$8.0 million in gross proceeds raised in the private placement of our Preferred Stock, \$0.3 million raised from the exercise of common stock warrants, offset by \$1.2 million in issuance costs. The cash provided by financing activities for the year ended December 31, 2015 was primarily due to the \$10.0 million in gross proceeds received from our 2015 Private Placement, offset by \$1.5 million in issuance costs.

Funding Requirements and Other Liquidity Matters

MAT2203 and MAT2501 are still in development stages. We expect to continue to incur significant expenses and increasing operating losses for the foreseeable future. We anticipate that our expenses will increase substantially if and as we:

- continue our Phase 2a clinical trials of MAT2203, our lead product candidate;
- initiate and continue the research and development of our other product candidates and potential product candidates, including MAT2501;
- seek to discover and develop additional product candidates using our cochleate lipid-crystal platform delivery technology, ;
- seek regulatory approvals for any product candidates that successfully complete clinical trials;

- establish a sales, marketing and distribution infrastructure in the future to commercialize any products for which we may obtain regulatory approval;
- require the manufacture of larger quantities of product candidates for clinical development and potentially commercialization;
- maintain, expand and protect our intellectual property portfolio;
- hire additional clinical, quality control and scientific personnel; and
- add operational, financial and management information systems and personnel, including personnel to support our product development and planned future commercialization efforts and personnel and infrastructure necessary to help us comply with our obligations as a public company.

We expect that our existing cash and cash equivalents will be sufficient to fund our operating expenses and capital expenditures requirements through the second quarter of 2018. In order to achieve our long term plans, we will need additional financing to fund our operating expenses and to initiate and conduct our intended clinical programs, file additional patent applications and enhance our intellectual property position for lead compounds, and prepare for submission of an NDA for MAT2203 and MAT2501, and potentially conduct preclinical work in order to identify product candidates utilizing our cochleate delivery platform technology. We have based this estimate on assumptions that may prove to be wrong in the future, and we may use our available capital resources sooner than we currently expect.

Until the time we can generate substantial product revenues from commercializing MAT2203, MAT2501 or any future product candidates, if ever, we expect to finance our cash needs through a combination of private and public equity offerings, debt financings, collaborations, strategic alliances and/or licensing arrangements. We do not have any committed external source of funds. To the extent that we raise additional capital through the sale of equity or convertible debt securities, the ownership interest of our stockholders will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect your rights as a common stockholder. Debt financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends and could increase our expenses and require that our assets secure such debt. If we raise additional funds through collaborations, strategic alliances or licensing arrangements with pharmaceutical partners, we may have to relinquish valuable rights to our technologies, future revenue streams, research programs or grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds when needed, we may be required to delay, limit, reduce or terminate our product development or future commercialization efforts or grant rights to develop and market any product candidates under our development that we would otherwise prefer to develop and market ourselves.

Contractual Obligations and Commitments

On November 1, 2013, the Company entered into a 7-year lease for office space in Bedminster, New Jersey which commenced in June, 2014 at a monthly rent of \$12,723, increasing to approximately \$14,200 per month toward the end of the term.

The Company was obligated to provide a security deposit of \$300,000 to obtain the office lease space. This deposit was reduced by \$100,000 in 2016 and 2015 and can be reduced down to \$50,000 in 2017, as long as the Company makes timely rental payments.

On December 15, 2016, the Company entered into a 10 year, 3 month lease to consolidate our locations while expanding our laboratory and manufacturing facilities. We estimate that the lease will begin on May 1, 2017, upon completion of construction. The monthly rent will start at approximately \$43,000, increasing to approximately \$64,000 in the final year.

To obtain the laboratory and facility site, the Company was obligated to provide a security deposit of \$586,000 in December 2016. This security deposit can be reduced \$100,000 on each of the first three anniversaries of the rent commencement date. On the fourth anniversary in the year 2021, it can be reduced another \$86,000, with the balance remaining over the life of the lease.

On February 18, 2016 the Company entered into a Cooperative Research and Development Agreement (CRADA) with the National Institute of Allergy and Infectious Diseases to support NIH investigators in the conduct of clinical research to investigate the safety, efficacy, and pharmacokinetics of encochleated drug products in patients with fungal, bacterial, or viral infections at an annual funding of \$200,000 per year for 3 years.

On November 10, 2016 the Company entered into a Cooperative Research and Development Agreement (CRADA) with the National Institute of Allergy and Infectious Diseases to support NIH investigators to acquire technical, statistical and administrative support for research activities as well as to pay for supplies and travel expenses for a total amount of \$132,568 paid in 4 equal quarterly installments beginning in the fourth quarter 2016 and each quarter during 2017.

Through our acquisition of Aquarius, we acquired a license from Rutgers University, The State University of New Jersey (successor in interest to the University of Medicine and Dentistry of New Jersey) for the cochleate delivery technology. The Amended and Restated Exclusive License Agreement between Aquarius and Rutgers provides for, among other things, (1) royalties on a tiered basis between low single digits and the mid-single digits of net sales of products using such licensed technology, (2) a one-time sales milestone fee of \$100,000 when and if sales of products using the licensed technology reach the specified sales threshold and (3) an annual license fee of initially \$10,000, increasing to \$50,000 over the term of the license agreement.

On September 12, 2016 the Company conducted a final closing of a private placement offering to accredited investors of shares of the Company's Series A Preferred Stock. As part of this offer, the investors received royalty payment rights if and when the Company generates sales of MAT2203 or MAT2501.

The Company also has employment agreements with certain employees which require the funding of a specific level of payments, if certain events, such as a change in control, termination without cause or retirement, occur.

Off-Balance Sheet Arrangements

We did not have during the periods presented, and we do not currently have, any off-balance sheet arrangements, as defined under SEC rules, such as relationships with unconsolidated entities or financial partnerships, which are often referred to as structured finance or special purpose entities, established for the purpose of facilitating financing transactions that are not required to be reflected on our balance sheets.

RECENT ACCOUNTING PRONOUNCEMENTS

Refer to Note 2, "Significant Accounting Policies," in the accompanying notes to the consolidated financial statements for a discussion of recent accounting pronouncements.

Item 7A. Quantitative And Qualitative Disclosures About Market Risk

Our exposure to market risk is limited to our cash and cash equivalents, all of which have maturities of one year or less. The primary objectives of our investment activities are to preserve principal, provide liquidity and maximize income without significantly increasing risk. Our primary exposure to market risk is interest income sensitivity, which is affected by changes in the general level of U.S. interest rates. However, because of the short-term nature of the instruments in our portfolio, a sudden change in market interest rates would not be expected to have a material impact on our financial condition and/or results of operation. We do not have any foreign currency or other derivative financial instruments.

Item 8. Financial Statements And Supplementary Data

Our financial statements, together with the independent registered public accounting firm report thereon, are incorporated by reference from the applicable information set forth in Part IV Item 15, "Exhibits, Financial Statement Schedules" of this Annual Report on Form 10-K.

Item 9. Changes In And Disagreements With Accountants On Accounting And Financial Disclosure

Not applicable.

Item 9A. Controls And Procedures

Evaluation of Disclosure Controls and Procedures

Evaluation of Disclosure Controls and Procedures.

As of December 31, 2016, we evaluated, with the participation of our principal executive officer and principal financial officer, the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (the "Exchange Act")). Based on that evaluation, our principal executive officer and principal financial officer concluded that our disclosure controls and procedures are effective at the reasonable assurance level as of December 31, 2016. Our disclosure controls and procedures are designed to provide reasonable assurance that information required to be disclosed in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within time periods specified by the SEC's rules and forms, and that such information is accumulated and communicated to our management, including principal executive officer and principal financial officer, as appropriate to allow timely decisions regarding required disclosure. In designing and evaluating our disclosure controls and procedures, management recognized that disclosure controls and procedures, no matter how well conceived and operated, can provide only reasonable, but not absolute, assurance that the objectives of the disclosure controls and procedures are met. The design of any disclosure control and procedure also is based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions.

Management's Report on Internal Control over Financial Reporting.

Our 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 Chief Executive Officer and Chief Financial Officer to provide reasonable assurance regarding the reliability of financial reporting and the preparation of consolidated financial statements for external purposes in accordance with generally accepted accounting principles and includes those policies and procedures that (1) pertain to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of our assets; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that our receipts and expenditures are being made only in accordance with authorizations of our management and directors; and (3) 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 consolidated financial statements.

Under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting based on criteria established in "Internal Control—Integrated Framework (2013)" issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Our management concluded that our internal control over financial reporting was effective as of December 31, 2016.

Changes in internal control over financial reporting.

There were no changes in our internal control over financial reporting during the quarter ended December 31, 2016 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information

On March 27, 2017, we entered into a new employment agreement with its chief executive officer, Roelof Rongen, with the terms effective as of March 1, 2017. Under the terms of Mr. Rongen's employment agreement, he will receive a base salary of \$400,000 per year, subject to periodic adjustments as determined by our Board or Compensation Committee. In addition, Mr. Rongen will also be eligible to receive an annual bonus, which is targeted at 50% of his base salary based on his individual performance and our performance as a whole, however the achievement of the performance criteria will be determined by our Board or Compensation Committee. Mr. Rongen received an annual bonus of \$160,000 for his performance during fiscal 2016. Mr. Rongen may also be eligible to receive option grants or other equity awards at the discretion of our Compensation Committee. In February 2017, Mr. Rongen received a grant of 600,000 options to purchase shares of our common stock at an exercise price of \$3.32 per share. The options vest in equal monthly installments over three years. If we terminate Mr. Rongen's employment without cause or Mr. Rongen resigns with good reason, subject to Mr. Rongen's execution and non-revocation of a release and compliance with any post-termination obligations owed to us, we are required to pay him a severance of up to twelve months of his base salary, in effect on the date of termination, plus COBRA payments for twelve months. In addition, the vesting of his outstanding options, and any other outstanding equity held by him at the time of his termination, will be accelerated by six months upon such termination. If we terminate Mr. Rongen's employment without cause during the 24 month period immediately following a change of control or Mr. Rongen resigns with good reason during the 24 month period immediately following a change of control, subject to Mr. Rongen's execution and non-revocation of a release and compliance with any post-termination obligations owed to us, we are required to pay him a severance of up to eighteen months of his base salary, in effect on the date of termination, and his target annual bonus for the year in which the termination occurs plus COBRA payments for eighteen months. In addition, his outstanding options and any other outstanding equity held by him at the time of his termination, would vest in full upon such termination. Mr. Rongen is also subject to a customary non-disclosure agreement, pursuant to which Mr. Rongen has agreed to be subject to a non-compete and non-solicit covenant during the term of his employment and for a period of eighteen months following termination of his employment.

PART III

Item 10. Directors, Executive Officers And Corporate Governance

All directors hold office for one-year terms until the election and qualification of their successors. Officers are appointed by our board of directors and serve at the discretion of the board, subject to applicable employment agreements. The following table sets forth information regarding our executive officers and the members of our board of directors.

<u>Name</u>	<u>Age</u>	<u>Position(s)</u>
Herbert Conrad	84	Chairman of the Board, Director
Roelof Rongen	51	Chief Executive Officer, Director
Jerome D. Jabbour	42	President
Raphael J. Mannino	69	Senior Vice President and Scientific Officer
Abdel A. Fawzy	66	Executive Vice President, Pharmaceutical and Supply Chain Development
Gary Gaglione	64	Vice President of Finance and Accounting, Acting Chief Financial Officer
Douglas F. Kling	43	Senior Vice President for Clinical Development and Project Management
Stefano Ferrari	56	Director
Adam Stern	52	Director
James S. Scibetta	52	Director

Management

Roelof Rongen has served as our Chief Executive Officer and one of our directors since July 2013 and as President, Chief Executive Officer a co-founder and a director of Matinas BioPharma since April 2012. He was also the Founder and Chairman of Essential Fatty Acid Therapeutics LLC, a biotech company focused on the development of innovative fatty acid derivatives. Prior to Matinas BioPharma, Mr. Rongen was Executive Vice President North American Operations for Trygg Pharma AS (subsequently named EPAX AS) (2009-2012) and Vice President of Life Cycle Management and Intellectual Property at Reliant Pharmaceuticals, Inc., or Reliant (2000-2008). While at Reliant, Mr. Rongen held various earlier positions, including head of the Omacor®/Lovaza® launch team, Executive Director of Marketing for Lescol® and Executive Director of Business Development. Prior to Reliant, Mr. Rongen was also Global Product Director for Humira® at BASF Pharma (1998-2000), later acquired by Abbott Laboratories; a consultant at The Wilkerson Group in New York (1995-1998) and Arthur D. Little in Amsterdam (1990-1993), and a Research Fellow in biochemistry at Baylor University in Texas (1989-1990). Mr. Rongen earned an MBA from Kellogg GSM at Northwestern University in Evanston, IL, and a graduate degree in Molecular Sciences from Wageningen University in the Netherlands.

Jerome D. Jabbour, JD became our President during March 2016. Prior to that he served as our Executive Vice President, Chief Business Officer, General Counsel and Secretary since October 2013 and as one of our directors from April 2012 until November 2013. Mr. Jabbour is also a Co-founder of Matinas BioPharma. Prior to joining our management team, he was the Executive Vice President and General Counsel of MediMedia USA, or MediMedia, from 2012 to October 2013, a privately held diversified health care services company. Prior to MediMedia, he was the Senior Vice President, Head of Global Legal Affairs of Wockhardt Limited (2008-2012) and Senior Counsel and Assistant Secretary at Reliant (2004-2008). Earlier in his career, he held positions as Commercial Counsel at Alphasigma, Inc. (2003-2004) and as a Corporate Associate at Lowenstein Sandler LLP (1999-2003). Mr. Jabbour earned his J.D. from Seton Hall University School of Law in New Jersey and a B.A. in Psychology from Loyola University in Baltimore.

Raphael J. Mannino has served as our Senior Vice President and Chief Scientific Officer since September 2015. From 1990 until August 2015, Dr. Mannino was an Associate Professor of Pathology and Laboratory Medicine at Rutgers University, New Jersey Medical School. Dr. Mannino founded BioDelivery Sciences, Inc., and served as its President, Chief Executive Officer and Chief Scientific Officer and a member of its Board of Directors from 1995 to 2000, when it was acquired by BioDelivery Sciences International, Inc. (NASDAQ: BDSI). Dr. Mannino served as BDSI's Executive Vice President and Chief Scientific Officer from 2001 to 2009 and a member of its Board of Directors from 2000 to 2007. Dr. Mannino's previous experience includes positions as Assistant, then Associate Professor, Albany Medical College (1980 to 1990), and Instructor then Assistant Professor, Rutgers Medical School (1977 to 1980). His postdoctoral training was from 1973 to 1976 at the Biocenter in Basel, Switzerland. Dr. Mannino received his Ph.D. in Biological Chemistry in 1973 from the Johns Hopkins University, School of Medicine.

Abdel A. Fawzy, PhD has served as our Executive Vice President for Pharmaceutical and Supply Chain Development since July 2013 and as Executive Vice President for Pharmaceutical and Supply Chain Development of Matinas BioPharma since August 2011. Dr. Fawzy is a Co-Founder of Matinas BioPharma. Prior to Matinas BioPharma, Dr. Fawzy was a founder of expert consulting firm DeMelle BioPharma (2008-2012) and Executive Director Pharmaceutical Development at Reliant, from 2000 to 2008. Earlier in his career, Dr. Fawzy held pharmaceutical development positions at Ascent Pharmaceuticals, Inc. (1994-2000), DuPont (1990-1994) and Squibb Marsam Pharmaceuticals (1989-1990). He is the inventor on 15 published patents and patent applications all related to the health and pharmaceutical development and manufacturing processes. Dr. Fawzy received his Ph.D. in Pharmaceutical Technology from Tuebingen University in Germany, a Pharmacy degree from Temple University in Philadelphia, PA, and a MS in Pharmaceutical Technology from the Cairo School of Pharmacy in Egypt.

Gary Gaglione, CPA has served as our Acting Chief Financial Officer, Vice President of Finance & Accounting since April 2013. Prior to joining us as a full time employee, Mr. Gaglione was President of MCM Consulting LLC from 2011 until October 2013. Prior to MCM Consulting, Mr. Gaglione was Senior Director of Finance at Shionogi USA, Inc. (2011). In 2009 and 2010, he was Vice President of Finance and Controller for Phytomedics, Inc. Prior to Phytomedics, he was Controller for ProStrakan Inc.'s U.S. operations. From 2001 to 2008, Mr. Gaglione was an Executive Director at Reliant, initially as head of Planning, Budgets and Analysis, then, from 2006 on, as head of Internal Audit and Sarbanes Oxley Compliance in preparation for a potential Reliant initial public offering. Before Reliant, he held numerous finance positions of increasing responsibility at the U.S. subsidiary of Hoffmann-La Roche Inc. (1976-2001), including Vice President of R&D Finance (1997-2001). He started his finance career at KPMG LLP (1974-1976). Mr. Gaglione earned a B.S. degree in Business Administration with a major in Accounting from Villanova University and an MBA in Finance from Seton Hall University.

Douglas F. Kling has served as our Senior Vice President for Clinical Development since March 12, 2015. Prior to Matinas, Mr. Kling held various positions at Omthera Pharmaceuticals, Inc. (acquired by AstraZeneca PLC in 2013) from August 2010 to December 2014, most recently as Senior Vice President of Clinical Development and Project Management. Prior to that, Mr. Kling served as Senior Director, Project Management at Shionogi USA Inc. (July 2009 to July 2010), as Senior Director, Program Management at The Medicines Company (April 2008 to July 2009) and in a variety of positions at Reliant (November 2000 to March 2008), most recently as Director, R&D Project Management. Mr. Kling earned his B.S. in biological sciences from Duke University and his M.B.A. from Rutgers Business School.

Directors

Herbert Conrad has served as our Chairman of the Board since July 2013 and as Chairman of the Board of Matinas BioPharma since October 2012. He also serves on the board of directors of Celldex Therapeutics, Inc. (NASDAQ: CLDX), Arbutus Biopharma Corporation (NASDAQ: ABUS) and as an Advisor to the Seaver Autism Center at Mount Sinai Hospital. Mr. Conrad was the President of the U.S. Pharmaceuticals Division of Hoffmann-La Roche, Inc. from 1982 until his retirement in 1993. Prior to that, he held many positions of increasing responsibility at Roche Pharmaceuticals in the United States. Mr. Conrad previously served on the board of directors of Pharmasset, Inc. (chairman), Savient Pharmaceuticals, Inc., (NASDAQ: SVNT) Dura Pharmaceuticals, Inc., UroCor, Inc., GenVec, Inc. (NASDAQ: GNVC) (chairman), Sicor, Inc., Bone Care International, Inc. (chairman), Sapphire Therapeutics, Inc. (chairman), the medical advisory board of Henry Schein Inc. (NASDAQ: HSIC), and he was a Director and Co-Founder of Reliant. Pharmasset was acquired by Gilead Sciences, Inc. for \$11 billion in 2011. He received B.S. and M.S. degrees from the Brooklyn College of Pharmacy and an honorary Doctorate in Humane Letters from Long Island University. We believe Mr. Conrad is qualified to serve on our board of directors due to his extensive expertise and experience in the life sciences industry and his extensive board experience.

Roelof Rongen. See description under “Management.”

Stefano Ferrari has served on our board of directors since July 2013 and as a director of Matinas BioPharma since October 2012. Mr. Ferrari is the CEO and a director of Prime Acquisition Corp., a private equity fund focusing on real estate and renewable energy, a position he has held since October 2013. He is also the founder and managing member of Chestnut Hill Sciences, LLC (2004), a human and animal health care company dedicated to the development of dietary supplements, including omega-3 based products. He is the founder of Murami Pharma, Inc. (“Murami”) and has served as its CEO since its inception in 2011. Murami is a biopharmaceutical development stage company focusing on small-peptide therapeutics. Prior to Murami, Mr. Ferrari was the CEO of Bioseutica B.V. (2008-2011), a multinational holding company comprising KD-Pharma, a leading manufacturer of omega-3-concentrates, and the leading lysozyme manufacturers Fordras and Neova Technologies, amongst others. Over the last 17 years, Mr. Ferrari was founder, common shareholder and senior executive of several multinational companies operating in the pharmaceutical, food and ingredients industries. Besides Bioseutica, these companies include Prospa B.V. (1995-2002), a multinational holding company in the pharmaceutical industry, Fordras S.A. (2002-2008), ProAparts Lda (2001-2012), and Societa Prodotti Antibiotici S.p.A., the Italian pharmaceutical company that developed and marketed polyene antifungal medications. Mr. Ferrari has served on several boards, including Ikonisys Inc., Carigent Therapeutics, Inc., The Richard B. Fisher Center for Performing Arts, and St. Simeon Lda, a private family fund. He has 25 years of experience in investing in diverse industries, including real estate, pharmaceuticals, and media and entertainment. Mr. Ferrari earned his B.A. degree in International Business Administration from the University of San Francisco. We believe Mr. Ferrari is qualified to serve on our board of directors due to his extensive expertise and experience in the development and marketing of polyene antifungal medications, his extensive contacts in the manufacturing industry related to omega-3 based products and also his M&A experience.

Adam Stern has served as a member of our board of directors since July 2013. Mr. Stern has been the head Private Equity Banking at Aegis Capital Corp. and CEO of SternAegis Ventures since 2012 and became one of our directors in July 2013. Prior to Aegis, from 1997 to November 2012, he was with Spencer Trask Ventures, Inc., most recently as a Senior Managing Director, where he managed the structured finance group focusing primarily on the technology and life science sectors. Mr. Stern held increasingly responsible positions from 1989 to 1997 with Josephthal & Co., Inc., members of the New York Stock Exchange, where he served as Senior Vice President and Managing Director of Private Equity Marketing. He has been a FINRA licensed securities broker since 1987 and a General Securities Principal since 1991. Mr. Stern is a director of Dance Biopharm, Inc. Mr. Stern is a former director of InVivo Therapeutics Holdings Corp. (OTCQB: NVIV), Organovo Holdings, Inc. (NYSE MKT: ONVO), LabStyle Innovations Corporation (OTCBB: DRIO) and PROLOR Biotech Ltd., which was sold to Opko Health, Inc. (NYSE: OPK) for approximately \$600 million in 2013. Mr. Stern holds a Bachelor of Arts degree with honors from The University of South Florida in Tampa. We believe Mr. Stern is qualified to serve on our board of directors because of his extensive experience in corporate finance and experience in the life science industries.

James S. Scibetta has served as a member of our board of directors since November 2013. He is currently President and Chief Financial Officer of Pacira Pharmaceuticals, Inc. (NASDAQ: PCRX), a position he has held since October 2015. Prior to that, Mr. Scibetta was the Chief Financial Officer of Pacira since 2008. Prior to joining Pacira in August 2008, he served as a consultant to Genzyme Corporation following the sale of Bioenvision Inc. (NASDAQ: BIVN) to Genzyme in 2007. From 2006 to 2007 Mr. Scibetta was CFO of Bioenvision. From 2001 to 2006, he was Executive Vice President and Chief Financial Officer of Merrimack Pharmaceuticals Inc. (NASDAQ: MACK). Mr. Scibetta has previously served on the board of directors at the following life sciences companies: Nephros Inc. (NASDAQ: NEPH), Merrimack Pharmaceuticals and Labopharm Inc. Prior to his executive management experience, Mr. Scibetta spent over a decade in investment banking where he was responsible for sourcing and executing transactions for a broad base of public and private healthcare and life sciences companies. Mr. Scibetta received his Bachelor of Science in Physics from Wake Forest University and an MBA from the University of Michigan. We believe Mr. Scibetta is qualified to serve on our board of directors because of his extensive management experience in the pharmaceutical industry, his investment banking experience and his experience as a chief financial officer and audit committee member of several publicly traded companies.

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

Scientific Advisory Board

We believe in seeking and attracting scientific and clinical leaders in the field of infectious diseases to provide counsel and support our growth. We have established a Scientific Advisory Board which consist of individuals who are experts in their chosen fields and recipients of many academic honors and awards.

Committees of the Board

Our board of directors has three standing committees — an Audit Committee, a Compensation Committee and a Nominating and Corporate Governance Committee.

Audit Committee. The Audit Committee oversees and monitors our financial reporting process and internal control system, review and evaluate the audit performed by our registered independent public accountants and report to the Board any substantive issues found during the audit. The Audit Committee is directly responsible for the appointment, compensation and oversight of the work of our registered independent public accountants. The Audit Committee reviews and approves all transactions with affiliated parties. The Board adopted a written charter for the Audit Committee, which is available on our website. James Scibetta, Herbert Conrad and Stefano Ferrari serve as members of the Audit Committee with James Scibetta, serving as its chairman. All of the members of the Audit Committee have been determined to be financially literate and are considered independent directors as defined under The NYSE MKT'S listing standards and applicable SEC rules and regulations. Mr. Scibetta qualifies as an audit committee "financial expert" as that term is defined by Commission regulations.

Compensation Committee. The Compensation Committee provides advice and make recommendations to the Board in the areas of employee salaries, benefit programs and director compensation. The Compensation Committee also reviews the compensation of our President and Chief Executive Officer and makes recommendations in that regard to the Board as a whole. The Board adopted a written charter for the Compensation Committee, which is available on our website. Stefano Ferrari, Herbert Conrad, and James Scibetta serve as members of the Compensation Committee, with Stefano Ferrari serving as its chairman. All of the members of the Compensation Committee are considered independent directors as defined under The NYSE MKT's listing standards.

Nominating and Corporate Governance Committee. The Nominating and Corporate Governance Committee nominates individuals to be elected to the full Board by our stockholders. The Nominating and Corporate Governance Committee considers recommendations from stockholders if submitted in a timely manner in accordance with the procedures set forth in our Bylaws and applies the same criteria to all persons being considered. The Board adopted a written charter for the Nominating and Corporate Governance Committee, which is available on our website. Herbert Conrad, Stefano Ferrari and James Scibetta serve as members of the Nominating and Corporate Governance Committee, with Herbert Conrad serving as its chairman. All of the members of the Nominating and Corporate Governance Committee are considered independent directors as defined under The NYSE MKT's listing standards.

Code of Business Conduct and Ethics

We have adopted a written code of business conduct and ethics that applies to our directors, officers and employees, including our principal executive officer, principal financial and accounting officer, or persons performing similar functions. A copy of the code is posted on the corporate governance section of our website, which is located at www.matinasbiopharma.com. If we make any substantive amendments to, or grant waivers from, the code of business conduct and ethics for any officer or director, we will disclose the nature of such amendment or waiver on our website.

Section 16(a) Beneficial Ownership Reporting Compliance

During the year ended December 31, 2016, since our common stock was not registered under Section 12 of the Exchange Act, our directors and executive officers and persons who beneficially own more than 10% of our common stock are not required to file with the SEC various reports as to their ownership of and activities relating to our common stock.

Item 11. Executive Compensation

Summary Compensation Table – 2016

The following table presents information regarding the total compensation awarded to, earned by, or paid to our chief executive officer and the two most highly-compensated executive officers (other than the chief executive officer) who were serving as executive officers as of December 31, 2016 for services rendered in all capacities to us for the years ended December 31, 2016 and December 31, 2015. These individuals are our named executive officers for 2016.

Name and Principal Position ⁽¹⁾	Year	Salary (\$)	Bonus (\$)	Option Awards(1) (\$)	All Other Compensation(\$)	Total (\$)
Roelof Rongen <i>Chief Executive Officer</i>	2016	283,750	160,000	116,250	-	560,000
	2015	300,000	132,000	101,638	-	533,638
Douglas F.Kling <i>Senior Vice President, Clinical Development & Project Management</i>	2016	236,458	100,000	62,000	-	398,458
	2015	198,840	-	145,602	-	344,442
Jerome D. Jabbour, <i>President</i>	2016	282,804	90,000	108,500	-	481,304
	2015	293,000	90,750	59,289	-	443,039

(1) Amounts reflect the grant date fair value of option awards granted in 2016 and 2015 in accordance with Accounting Standards Codification Topic 718. These amounts do not correspond to the actual value that will be recognized by the named executive officers.

Narrative Disclosure to Summary Compensation Table

Employment Agreements with Our Named Executive Officers

Rongen

On July 30, 2013 we entered into an employment agreement with Mr. Rongen for a period of three years. Under the terms of Mr. Rongen's employment agreement, he received a signing bonus of \$150,000 and will receive a base salary of \$300,000 per year. In addition, Mr. Rongen will also be eligible to receive an annual bonus, which is targeted at 40% of his base salary but which may be adjusted by our Compensation Committee based on his individual performance and our performance as a whole. Mr. Rongen may also be eligible to receive option grants at the discretion of our Compensation Committee. In October 2013, Mr. Rongen received a grant of 350,000 options at an exercise price of \$0.94 per share. The options vest in equal monthly installments over three years from August 1, 2013. If we terminate Mr. Rongen's employment without cause or Mr. Rongen resigns with good reason, we are required to pay him a severance of up to twelve months of his base salary plus benefits. In addition, the vesting of his outstanding options will be accelerated by six months upon such termination. If we terminate Mr. Rongen's employment without cause during the 24 month period immediately following a change of control or Mr. Rongen resigns with good reason during the 24 month period immediately following a change of control, we are required to pay him a severance of up to eighteen months of his base salary and his target annual bonus plus benefits. In addition, his outstanding options would vest in full upon such termination. Mr. Rongen's employment agreement provides for an increase in base salary of \$50,000 annually, upon a future closing of an additional round of financing of at least \$15 million and the initiation of the first Phase III study of MAT9001. Mr. Rongen will also be subject to a customary non-disclosure agreement, pursuant to which Mr. Rongen has agreed to be subject to a non-compete during the term of his employment and for a period of eighteen months following termination of his employment. As part of our cost reduction measures, we have entered into a letter agreement with Mr. Rongen effective as of April 1, 2016 that provides for, among other things, a 10% reduction in base salary through December 31, 2016 and a requirement that the executive contribute 20% of the applicable premium cost for healthcare coverage under the Company's group health plan. The letter agreement also provides that for purposes of calculating any severance payments, the base salary will be the base salary prior to such temporary reduction and therefore the temporary reduction in base salary will not impact the amounts that would be paid to the executive if his employment was terminated. Effective October 1, 2016, the Board restated Mr. Rongen's salary to its level prior to the 10% reduction.

On February 21, 2017, the Compensation Committee of the Board approved for Mr. Rongen an annual salary of \$400,000 effective March 1, 2017 and target bonus of 50%. On March 27, 2017, Matinas BioPharma Holdings, Inc. (the "Company") entered into a new employment agreement with its chief executive officer, Roelof Rongen, with the terms effective as of March 1, 2017. Under the terms of Mr. Rongen's employment agreement, he will receive a base salary of \$400,000 per year, subject to periodic adjustments as determined by our Board or Compensation Committee. In addition, Mr. Rongen will also be eligible to receive an annual bonus, which is targeted at 50% of his base salary based on his individual performance and our performance as a whole, however the achievement of the performance criteria will be determined by our Board or Compensation Committee. Mr. Rongen received an annual bonus of \$160,000 for his performance during fiscal 2016. Mr. Rongen may also be eligible to receive option grants or other equity awards at the discretion of our Compensation Committee. In February 2017, Mr. Rongen received a grant of 600,000 options to purchase shares of our common stock at an exercise price of \$3.32 per share. The options vest in equal monthly installments over three years. If we terminate Mr. Rongen's employment without cause or Mr. Rongen resigns with good reason, subject to Mr. Rongen's execution and non-revocation of a release and compliance with any post-termination obligations owed to us, we are required to pay him a severance of up to twelve months of his base salary, in effect on the date of termination, plus COBRA payments for twelve months. In addition, the vesting of his outstanding options, and any other outstanding equity held by him at the time of his termination, will be accelerated by six months upon such termination. If we terminate Mr. Rongen's

employment without cause during the 24 month period immediately following a change of control or Mr. Rongen resigns with good reason during the 24 month period immediately following a change of control, subject to Mr. Rongen's execution and non-revocation of a release and compliance with any post-termination obligations owed to us, we are required to pay him a severance of up to eighteen months of his base salary, in effect on the date of termination, and his target annual bonus for the year in which the termination occurs plus COBRA payments for eighteen months. In addition, his outstanding options and any other outstanding equity held by him at the time of his termination, would vest in full upon such termination. Mr. Rongen is also subject to a customary non-disclosure agreement, pursuant to which Mr. Rongen has agreed to be subject to a non-compete and non-solicit covenant during the term of his employment and for a period of eighteen months following termination of his employment.

Kling

On March 12, 2015 we entered into an employment agreement with Mr. Kling for a period of three years. Under the terms of Mr. Kling's employment agreement, upon signing the agreement he received a grant of 350,000 options and he will receive a base salary of \$250,000 per year. In addition, Mr. Kling will also be eligible to receive an annual bonus, which is targeted at 30% of his base salary but which may be adjusted by our Compensation Committee based on his individual performance and our performance as a whole. Mr. Kling will also be eligible to receive option grants at the discretion of our Compensation Committee. In February 2016, Mr. Kling received a grant of 200,000 options at an exercise price of \$0.43 per share. The options vest in equal monthly installments over three years from February 2016. If we terminate Mr. Kling's employment without cause or Mr. Kling resigns with good reason, we are required to pay him a severance of up to nine months of his base salary plus benefits. In addition, the vesting of his outstanding options will be accelerated by six months upon such termination. If we terminate Mr. Kling's employment without cause during the 24 month period immediately following a change of control or Mr. Kling resigns with good reason during the 24 month period immediately following a change of control, we are required to pay him a severance of up to eighteen months of his base salary and his target annual bonus plus benefits. In addition, his outstanding options would vest in full upon such termination. Mr. Kling will also be subject to a customary non-disclosure agreement, pursuant to which Mr. Kling has agreed to be subject to a non-compete during the term of his employment and for a period of eighteen months following termination of his employment. As part of our cost reduction measures, we have entered into a letter agreement with Mr. Kling effective as of April 1, 2016 that provides for, among other things, a 10% reduction in base salary through December 31, 2016 and a requirement that the executive contribute 20% of the applicable premium cost for healthcare coverage under the Company's group health plan. The letter agreement also provides that for purposes of calculating any severance payments, the base salary will be the base salary prior to such temporary reduction and therefore the temporary reduction in base salary will not impact the amounts that would be paid to the executive if his employment was terminated. Effective October 1, 2016, the Board restated Mr. Kling's salary to its level prior to the 10% reduction.

On February 21, 2017, the Compensation Committee of the Board approved for Mr. Kling an annual salary of \$ 290,000 effective March 1, 2017 and target bonus of 30%.

Jabbour

On September 3, 2013, we entered into an employment agreement with Mr. Jabbour for a period of three years, which was effective as of October 4, 2013. Under the terms of Mr. Jabbour's employment agreement, Mr. Jabbour received a signing bonus of \$75,000 and will receive a base salary of \$275,000 per year. In addition, Mr. Jabbour will also be eligible to receive an annual bonus, which is targeted at 30% of his base salary but which may be adjusted by our Compensation Committee based on his individual performance and our performance as a whole. Mr. Jabbour will also be eligible to receive option grants at the discretion of our Compensation Committee. On October 4, 2013, Mr. Jabbour received a grant of 200,000 options at an exercise of \$0.94 per share. The options will vest in equal monthly installments over three years from the date of grant. Mr. Jabbour also received a grant of 150,000 at an exercise price of \$0.94 per share, which vests in equal monthly installments over three years beginning on August 1, 2013. If we terminate Mr. Jabbour's employment without cause or Mr. Jabbour resigns with good reason, we are required to pay him a severance of up to nine months of his base salary plus benefits. In addition, the vesting of his outstanding options will be accelerated by six months upon such termination. If we terminate Mr. Jabbour's employment without cause during the 24 month period immediately following a change of control or Mr. Jabbour resigns with good reason during the 24 month period immediately following a change of control, we are required to pay him a severance of up to eighteen months of his base salary and his target annual bonus plus benefits. In addition, his outstanding options would vest in full upon such termination. Mr. Jabbour's employment agreement provides for an increase in base salary of \$50,000 annually, upon the closing of an additional round of financing of at least \$15 million and the initiation of the first Phase III study of MAT9001. Mr. Jabbour will also be subject to a customary non-disclosure agreement, pursuant to which Mr. Jabbour has agreed to be subject to a non-compete during the term of his employment and for a period of eighteen months following termination of his employment. As part of our cost reduction measures, we have entered into a letter agreement with Mr. Jabbour effective as of April 1, 2016 that provides for, among other things, a 10% reduction in base salary through December 31, 2016 and a requirement that the executive contribute 20% of the applicable premium cost for healthcare coverage under the Company's group health plan. The letter agreement also provides that for purposes of calculating any severance payments, the base salary will be the base salary prior to such temporary reduction and therefore the temporary reduction in base salary will not impact the amounts that would be paid to the executive if his employment was terminated. Effective October 1, 2016, the Board restated Mr. Jabbour's salary to its level prior to the 10% salary reduction.

Outstanding Equity Awards at Fiscal Year-End Table – 2016

The following table summarizes, for each of the named executive officers, the number of shares of common stock underlying outstanding stock options held as of December 31, 2016.

Name	Option Awards			
	Number of securities underlying unexercised options (#) exercisable	Number of securities underlying unexercised options (#) unexercisable	Option exercise price (\$)	Option expiration date
Roelof Rongen	114,593	260,408	\$ 0.43	Feb. 14, 2026
	200,016	99,984	0.41	Jan. 27, 2025
	350,000	0	\$ 1.28	July 20, 2024
	350,000	0	\$ 0.94	October 2, 2023
Doug Kling	61,116	138,884	\$ 0.43	Feb. 14, 2026
	213,906	136,094	\$.52	Mar. 11, 2025
Jerome D. Jabbour	106,953	243,047	\$ 0.43	Feb. 14, 2026
	116,676	58,324	0.41	Jan. 27, 2025
	350,000	0	\$ 1.28	July 20, 2024
	350,000	0	\$ 0.94	October 3, 2023

2013 Equity Compensation Plan

General

On August 2, 2013, our Board of Directors adopted the 2013 Equity Compensation Plan pursuant to the terms described herein. The 2013 Equity Compensation Plan was approved by the stockholders on August 7, 2013. Effective May 8, 2014, upon the approval of our Board of Directors and our stockholders, we amended and restated our 2013 Equity Compensation Plan, primarily to include “evergreen” provisions, which state provide that number of shares of common stock available for issuance under the Plan is subject to an automatic annual increase on January 1 of each year beginning in 2015 equal to 4% of the number of shares of common stock outstanding on December 31 of the preceding calendar year or a lesser number of shares of common stock determined by the Board of Directors; to amend the definition of “fair market value”; and to increase the limits on awards under the Plan. The 2013 Equity Compensation Plan, as amended and restated, is referred to herein as the “2013 Plan.”

The general purpose of the 2013 Plan is to provide an incentive to our employees, directors, consultants and advisors by enabling them to share in the future growth of our business. Our Board of Directors believes that the granting of stock options, restricted stock awards, unrestricted stock awards and similar kinds of equity-based compensation promotes continuity of management and increases incentive and personal interest in the welfare of our Company by those who are primarily responsible for shaping and carrying out our long range plans and securing our growth and financial success.

Our Board of Directors believes that the 2013 Plan will advance our interests by enhancing our ability to (a) attract and retain employees, consultants, directors and advisors who are in a position to make significant contributions to our success; (b) reward our employees, consultants, directors and advisors for these contributions; and (c) encourage employees, consultants, directors and advisors to take into account our long-term interests through ownership of our shares.

Description of the 2013 Equity Compensation Plan

The following description of the principal terms of the 2013 Plan is a summary and is qualified in its entirety by the full text of the 2013 Plan, which is attached as Exhibit 10.6 hereto.

Administration. The 2013 Plan will be administered by the Compensation Committee of our Board of Directors, provided that the entire Board of Directors may act in lieu of the Compensation Committee on any matter, subject to certain requirements set forth in the 2013 Plan. The Compensation Committee may grant options to purchase shares of our common stock, stock appreciation rights, stock units, restricted shares of our common stock, performance shares, performance units, incentive bonus awards, other cash-based awards and other stock-based awards. The Compensation Committee also has broad authority to determine the terms and conditions of each option or other kind of award, and adopt, amend and rescind rules and regulations for the administration of the 2013 Plan. Subject to applicable law, the Compensation Committee may authorize one or more reporting persons (as defined in the 2013 Plan) or other officers to make awards (other than awards to reporting persons, or other officers whom the Compensation Committee has specifically authorized to make awards). No awards may be granted under the 2013 Plan on or after the ten year anniversary of the adoption of the 2013 Plan by our Board of Directors, but awards granted prior to such tenth anniversary may extend beyond that date.

Eligibility. Awards may be granted under the 2013 Plan to any person who is an employee, officer, director, consultant, advisor or other individual service provider of the Company or any subsidiary, or any person who is determined by the Compensation Committee to be a prospective employee, officer, director, consultant, advisor or other individual service provider of the Company or any subsidiary.

Shares Subject to the 2013 Plan. As of March 22, 2017 the aggregate number of shares of common stock available for issuance in connection with awards granted under the 2013 Plan is 14,155,292 shares, subject to customary adjustments for stock splits, stock dividends or similar transactions (the "Initial Limit"). Incentive Stock Options may be granted under the 2013 Plan with respect to all of those shares. The number of shares of common stock available for issuance under the 2013 Plan will automatically increase on January 1st of each year for a period of ten years, commencing on January 1, 2015, in an amount equal to four percent (4%) of the total number of shares of common stock outstanding on December 31st of the preceding calendar year (the "Annual Increase"). Notwithstanding the foregoing, the Board of Directors may act prior to the first day of any calendar year, to provide that there shall be no increase in the share reserve for such calendar year or that the Annual Increase in the share reserve for such calendar year shall be a lesser number of shares of common stock than would otherwise occur pursuant to the preceding sentence. The number of shares of common stock which may be issued in respect of Incentive Stock Options is equal to the Current Limit, and will be increased on each January 1, by the Annual Increase for such calendar year.

To the extent that any award under the 2013 Plan payable in shares of common stock is forfeited, cancelled, returned to the Company for failure to satisfy vesting requirements or upon the occurrence of other forfeiture events, or otherwise terminates without payment being made thereunder, the shares of common stock covered thereby will be available for future grants under the 2013 Plan. Shares of common stock that otherwise would have been issued upon the exercise of a stock option or in payment with respect to any other form of award, that are surrendered in payment or partial payment of taxes required to be withheld with respect to the exercise of such stock option or the making of such payment, will also be available for future grants under the 2013 Plan.

Terms and Conditions of Options. Options granted under the 2013 Plan may be either "incentive stock options" that are intended to meet the requirements of Section 422 of the Internal Revenue Code of 1986, as amended (the "Code") or "nonqualified stock options" that do not meet the requirements of Section 422 of the Code. The Compensation Committee will determine the exercise price of options granted under the 2013 Plan. The exercise price of stock options may not be less than the fair market value, on the date of grant, per share of our common stock issuable upon exercise of the option (or 110% of fair market value in the case of incentive options granted to a ten-percent stockholder).

If on the date of grant the common stock is listed on a stock exchange or national market system, the fair market value shall generally be the closing sale price as of such date, or if there were no trades recorded on such date, then the most recent date preceding such date on which trades were recorded. If on the date of grant the common stock is traded in an over-the-counter market, the fair market will generally be the average of the closing bid and asked prices for the shares of common stock as of such date, or, if there are no closing bid and asked prices for the shares of common stock on such date, then the average of the bid and asked prices for the shares of common stock on the most recent date preceding such date on which such closing bid and asked prices are available. If the common stock is not listed on a national securities exchange or national market system or traded in an over-the-counter market, the fair market value shall be determined by the Compensation Committee in a manner consistent with Section 409A of the Internal Revenue Code of 1986, as amended. Notwithstanding the foregoing, if on the date of grant the common stock is listed on a stock exchange or is quoted on a national market system, or is traded in an over-the-counter market, then solely for purposes of determining the exercise price of any grant of a stock option or the base price of any grant of a stock appreciation right, the Compensation Committee may, in its discretion, base fair market value on the last sale before or the first sale after the grant, the closing price on the trading day before or the trading day of the grant, the arithmetic mean of the high and low prices on the trading day before or the trading day of the grant, or any other reasonable method using actual transactions of the common stock as reported by the exchange or market on which the common stock is traded. In addition, the determination of fair market value also may be made using any other method permitted under Treasury Regulation section 1.409A-1(b)(5) (iv).

No option may be exercisable for more than ten years from the date of grant (five years in the case of an incentive stock option granted to a ten-percent stockholder). Options granted under the 2013 Plan will be exercisable at such time or times as the Compensation Committee prescribes at the time of grant. No employee may receive incentive stock options that first become exercisable in any calendar year in an amount exceeding \$100,000. The Compensation Committee may, in its discretion, permit a holder of a nonqualified stock option to exercise the option before it has otherwise become exercisable, in which case the shares of our common stock issued to the recipient will continue to be subject to the vesting requirements that applied to the option before exercise.

Generally, the option price may be paid in cash or by bank check, or such other means as the Compensation Committee may accept. As set forth in an award agreement or otherwise determined by the Compensation Committee, in its sole discretion, at or after grant, payment in full or part of the exercise price of an option may be made (a) in the form of shares of common stock that have been held by the participant for such period as the Compensation Committee may deem appropriate for accounting purposes or otherwise, valued at the fair market value of such shares on the date of exercise; (ii) by surrendering to the Company shares of common stock otherwise receivable on exercise of the option; (iii) by a cashless exercise program implemented by the Compensation Committee in connection with the 2013 Plan; and/or (iv) by such other method as may be approved by the Compensation Committee and set forth in an award agreement.

No option may be transferred other than by will or by the laws of descent and distribution, and during a recipient's lifetime an option may be exercised only by the recipient or the recipient's guardian or legal representative. However, the Compensation Committee may permit the transfer of a nonqualified stock option, share-settled stock appreciation right, restricted stock award, performance share or share-settled other stock-based award either (a) by instrument to the participant's immediate family (as defined in the 2013 Plan), (b) by instrument to an inter vivos or testamentary trust (or other entity) in which the award is to be passed to the participant's designated beneficiaries, or (c) by gift to charitable institutions. The Compensation Committee will determine the extent to which a holder of a stock option may exercise the option following termination of service.

Stock Appreciation Rights. The Compensation Committee may grant stock appreciation rights independent of or in connection with an option. The Compensation Committee will determine the terms applicable to stock appreciation rights. The base price of a stock appreciation right will be determined by the Compensation Committee, but will not be less than 100% of the fair market value of a share of our common stock with respect to the date of grant of such stock appreciation right. The maximum term of any SAR granted under the 2013 Plan is ten years from the date of grant. Generally, each SAR stock appreciation right will entitle a participant upon exercise to an amount equal to:

- the excess of the fair market value of a share of common stock on the date of exercise of the stock appreciation right over the base price of such stock appreciation right, multiplied by
- the number of shares as to which such stock appreciation right is exercised.

Payment may be made in shares of our common stock, in cash, or partly in common stock and partly in cash, all as determined by the Compensation Committee.

Restricted Stock and Stock Units. The Compensation Committee may award restricted common stock and/or stock units under the 2013 Plan. Restricted stock awards consist of shares of stock that are transferred to a participant subject to restrictions that may result in forfeiture if specified conditions are not satisfied. Stock units confer the right to receive shares of our common stock, cash, or a combination of shares and cash, at a future date upon or following the attainment of certain conditions specified by the Compensation Committee. The Compensation Committee will determine the restrictions and conditions applicable to each award of restricted stock or stock units, which may include performance-based conditions. Dividends with respect to restricted stock may be paid to the holder of the shares as and when dividends are paid to stockholders or at the times of vesting or other payment of the restricted stock award. Stock unit awards may be granted with dividend equivalent rights, which may be accumulated and may be deemed reinvested in additional stock units, as determined by the Compensation Committee in its discretion. If any dividend equivalents are paid while a stock unit award is subject to restrictions, the dividend equivalents shall be subject to the same restrictions on transferability as the underlying stock units, unless otherwise set forth in an award agreement. Unless the Compensation Committee determines otherwise, holders of restricted stock will have the right to vote the shares.

Performance Shares and Performance Units. The Compensation Committee may award performance shares and/or performance units under the 2013 Plan. Performance shares and performance units are awards which are earned during a specified performance period subject to the attainment of performance criteria, as established by the Compensation Committee. The Compensation Committee will determine the restrictions and conditions applicable to each award of performance shares and performance units.

Incentive Bonus Awards. The Compensation Committee may award Incentive Bonus Awards under the 2013 Plan. Incentive Bonus Awards may be based upon the attainment of specified levels of Company or subsidiary performance as measured by pre-established, objective performance criteria determined at the discretion of the Compensation Committee. Incentive Bonus Awards will be paid in cash or common stock, as set forth in an award agreement

Other Stock-Based and Cash-Based Awards. The Compensation Committee may award other types of equity-based or cash-based awards under the 2013 Plan, including the grant or offer for sale of unrestricted shares of our common stock and payment in cash or otherwise of amounts based on the value of shares of common stock.

Section 162(m) Compliance. If stock or cash-based awards are intended to satisfy the conditions for deductibility under Section 162(m) of the Code as “performance-based compensation,” the performance criteria will be selected from among the following, which may be applied to our Company as a whole, any subsidiary or any division or operating unit thereof: (a) pre-tax income; (b) after-tax income; (c) net income; (d) operating income or profit; (e) cash flow, free cash flow, cash flow return on investment, net cash provided by operations, or cash flow in excess of cost of capital; (f) earnings per share; (g) return on equity; (h) return on sales or revenues; (i) return on invested capital or assets; (j) cash, funds or earnings available for distribution; (k) appreciation in the fair market value of the common stock; (l) operating expenses; (m) implementation or completion of critical projects or processes; (n) return on investment; (o) total return to stockholders; (p) dividends paid; (q) net earnings growth; (r) related return ratios; (s) increase in revenues; (t) the Company’s published ranking against its peer group of pharmaceutical companies based on total stockholder return; (u) net earnings; (v) changes (or the absence of changes) in the per share or aggregate market price of the common stock; (w) number of securities sold; (x) earnings before or after any one or more of the following items: interest, taxes, depreciation or amortization, as reflected in the Company’s financial reports for the applicable period; (y) total revenue growth; (z) economic value created; (aa) operating margin or profit margin; (bb) share price or total shareholder return; (cc) cost targets, reductions and savings, productivity and efficiencies; (dd) strategic business criteria, consisting of one or more objectives based on meeting objectively determinable criteria: specified market penetration, geographic business expansion, progress with research and development activities, investor satisfaction, employee satisfaction, human resources management, supervision of litigation, information technology, and goals relating to acquisitions, divestitures, joint ventures and similar transactions, and budget comparisons; (ee) objectively determinable personal or professional objectives, including any of the following performance goals: the implementation of policies and plans, the negotiation of transactions, the development of long term business goals, formation of joint ventures, research or development collaborations, and the completion of other corporate transactions, and (ff) any combination of, or a specified increase or improvement in, any of the foregoing.

At the end of the performance period established in connection with any award, the Compensation Committee will determine the extent to which the performance goal or goals established for such award have been attained, and shall determine, on that basis, the number of performance shares or performance units included in such award that have been earned and as to which payment will be made. The Compensation Committee will certify in writing the extent to which it has determined that the performance goal or goals established by it for such award have been attained.

With respect to awards intended to be performance-based compensation under Section 162(m) of the Code, no participant of the 2013 Plan may receive in any one fiscal year (a) options or stock appreciation rights relating to more than 2,500,000 shares of our common stock, and (b) stock units, restricted shares, performance shares, performance units or other stock-based awards that are denominated in shares of common stock relating to more than 2,500,000 shares of our common stock in the aggregate. The maximum dollar value payable to any participant for a fiscal year of the Company with respect to any awards under the 2013 Plan payable in cash is \$2,500,000.

Effect of Certain Corporate Transactions. The Compensation Committee may, at the time of the grant of an award, provide for the effect of a change in control (as defined in the 2013 Plan) on any award, including (i) accelerating or extending the time periods for exercising, vesting in, or realizing gain from any award, (ii) eliminating or modifying the performance or other conditions of an award, (iii) providing for the cash settlement of an award for an equivalent cash value, as determined by the Compensation Committee, or (iv) such other modification or adjustment to an award as the Compensation Committee deems appropriate to maintain and protect the rights and interests of participants upon or following a change in control. The Compensation Committee may, in its discretion and without the need for the consent of any recipient of an award, also take one or more of the following actions contingent upon the occurrence of a change in control: (a) cause any or all outstanding options and stock appreciation rights to become immediately exercisable, in whole or in part; (b) cause any other awards to become non-forfeitable, in whole or in part; (c) cancel any option or stock appreciation right in exchange for a substitute option; (d) cancel any award of restricted stock, stock units, performance shares or performance units in exchange for a similar award of the capital stock of any successor corporation; (e) redeem any restricted stock, stock unit, performance share or performance unit for cash and/or other substitute consideration with a value equal to the fair market value of an unrestricted share of our common stock on the date of the change in control; (f) cancel any option or stock appreciation right in exchange for cash and/or other substitute consideration based on the value of our common stock on the date of the change in control, and cancel any option or stock appreciation right without any payment if its exercise price exceeds the value of our common stock on the date of the change in control; (g) cancel any stock unit or performance unit held by a participant affected by the change in control in exchange for cash and/or other substitute consideration with a value equal to the fair market value per share of common stock on the date of the change in control, or (h) make such other modifications, adjustments or amendments to outstanding awards as the Compensation Committee deems necessary or appropriate.

Amendment, Termination. The Compensation Committee may amend the terms of awards in any manner not inconsistent with the 2013 Plan, provided that no amendment shall adversely affect the rights of a participant with respect to an outstanding award without the participant's consent. In addition, our board of directors may at any time amend, suspend, or terminate the 2013 Plan, provided that (i) no such amendment, suspension or termination shall materially and adversely affect the rights of any participant under any outstanding award without the consent of such participant and (ii) to the extent necessary and desirable to comply with any applicable law, regulation, or stock exchange rule, the 2013 Plan requires us to obtain stockholder consent. Stockholder approval is required for any plan amendment that increases the number of shares of common stock available for issuance under the 2013 Plan or changes the persons or classes of persons eligible to receive awards.

Tax Withholding

The Company has the power and right to deduct or withhold, or require a participant to remit to the Company, the minimum statutory amount to satisfy federal, state, and local taxes, domestic or foreign, required by law or regulations to be withheld.

Director Compensation

In October 2013, we adopted a compensation policy pursuant to which our non-employee directors receive annualized compensation of \$20,000 per year, with an additional \$10,000 per year for the Chairman of the Board and the Chair of the Audit Committee, as well as an additional \$5,000 per year for the Chairs of the Compensation and Nomination & Governance Committees. In addition, our independent board members will receive an option grant of 150,000 options, with the exception of the Chairman of the Board, who will be granted 200,000 options. In August 2014, we revised our compensation policy to provide that directors will receive restricted stock in lieu of cash fees.

Director Compensation Table – 2016

The following table summarizes the annual compensation for our non-employee directors during 2016.

Name	Stock Awards(\$) (1)	Option Awards (\$)(1)	Total (\$)
Herbert Conrad	72,500	10,850	83,350
Stefano Ferrari	45,000	6,975	51,975
James S. Scibetta	50,000	6,975	56,975
Adam Stern	35,000	6,820	41,820

(1) Amounts reflect the grant date fair value of stock awards and option awards granted in 2016 in accordance with Accounting Standards Codification Topic 718. These amounts do not correspond to the actual value that will be recognized by the directors.

On February 21, 2017, non-employee directors were awarded stock awards as compensation for 2017. The dollar amounts were \$65,000 for H. Conrad, \$56,250 for S. Ferrari, \$58,750 for J. Scibetta and \$35,000 for A. Stern. These stock awards vest on a quarterly basis based on service during 2017.

Item 12. Security Ownership Of Certain Beneficial Owners And Management And Related Stockholder Matters.

The following table sets forth the number of shares of common stock beneficially owned as of March 15, 2017 by:

- each of our stockholders who is known by us to beneficially own 5% or more of our common stock;
- each of our executive officers;

- each of our directors; and
- all of our directors and current executive officers as a group.

Beneficial ownership is determined based on the rules and regulations of the Commission. A person has beneficial ownership of shares if such individual has the power to vote and/or dispose of shares. This power may be sole or shared and direct or indirect. Applicable percentage ownership in the following table is based on 89,055,327 shares outstanding as of March 15, 2017. In computing the number of shares beneficially owned by a person and the percentage ownership of that person, shares of common stock that are subject to options or warrants held by that person and exercisable as of, or within 60 days of, March 15, 2017. These shares, however, are not counted as outstanding for the purposes of computing the percentage ownership of any other person(s). Except as may be indicated in the footnotes to this table and pursuant to applicable community property laws, each person named in the table has sole voting and dispositive power with respect to the shares of common stock set forth opposite that person's name. Unless indicated below, the address of each individual listed below is c/o Matinas BioPharma Holdings, Inc., 1545 Route 206 South, Suite 302, Bedminster, NJ 07921.

Name of Beneficial Owner	Number of Shares Beneficially Owned	Percentage of Shares Beneficially Owned
<i>5% Stockholders</i>		
Jennifer Lorenzo(1)	15,918,003	16.9%
Laurence G. Allen(2)	4,811,250	5.4%
<i>Directors and Executive Officers</i>		
Roelof Rongen(3)	4,709,454	5.2%
Herbert Conrad(4)	4,585,807	5.1%
Stefano Ferrari(5)	1,273,773	1.4%
James Scibetta (6)	830,535	*%
Adam Stern (7)	8,907,567	9.7%
Abdel A. Fawzy, Ph.D.(8)	2,559,086	2.8%
Gary Gaglione(9)	305,005	*
Jerome Jabbour(10)	1,800,374	2.0%
Douglas King(11)	460,586	*
Raphael Mannino (12)	1,668,936	1.9%
Directors and Executive Officers as a group (10 persons) (13)	27,101,123	30.4%

* Less than 1%

(1) Based on information contained in a Schedule 13D filed on March 22, 2017. Includes (i) 521,243 shares of common stock owned by Ms. Lorenzo, (ii) 10,496,760 shares of common stock held by GJG Life Sciences, LLC and (iii) 4,900,000 shares of common stock underlying shares of Series A Preferred Stock held by GJG Life Sciences, LLC. GJG Capital, LLC is the Managing Member of GJG Life Sciences, LLC, a limited liability company. Ms. Lorenzo is the Managing Member of GJG Capital, LLC and, as a result, Ms. Lorenzo and GJG Capital, LLC may be deemed to be indirect beneficial owners. The address for reporting persons is c/o GJG Capital, LLC. 107 Circle Road, Staten Island, NY 10304.

(2) Includes 30,000 convertible preferred shares if converted to 300,000 common shares.

(3) Includes 1,175,038 shares of common stock issuable upon exercise of options that are exercisable within sixty days of March 15, 2017. Does not include 799,962 shares of common stock underlying options that are not exercisable within sixty days of March 15, 2017

(4) Includes (i) 20,000 convertible preferred shares if converted to 200,000 common shares (ii) 606,207 shares of common stock issuable upon exercise of options that are exercisable within sixty days of March 15, 2017. Does not include 57,126 shares of common stock underlying options that are not exercisable within sixty days of March 15, 2017.

(5) Includes (i) 246,000 shares of common stock issuable upon exercise of outstanding Warrants that are exercisable within sixty days of March 15, 2017 (ii) 477,226 shares of common stock issuable upon exercise of options that are exercisable within sixty days of March 15, 2017. Does not include 45,274 shares of common stock underlying options that are not exercisable within sixty days of March 15, 2017.

(6) Includes 417,226 shares of common stock issuable upon exercise of options that are exercisable within sixty days of March 15, 2017. Does not include 45,274 shares of common stock underlying options that are not exercisable within sixty days of March 15, 2017.

(7) Includes (i) 1,702,676 shares of common stock issuable upon exercise of outstanding Warrants that are exercisable within sixty days of March 15, 2017, (ii) 421,416 shares of common stock issuable upon exercise of options that are exercisable within sixty days of March 15, 2017, (iii) 300,000 shares of common stock that are owned by Pavilion Capital Partners, LLC, which is wholly-owned by Mr. Stern, (iv) 300,000 shares of common stock that are owned by Piper Ventures Partners, LLC, which is wholly-owned by Mr. Stern, (v) 600,000 shares of common stock that are owned by SternAegis Ventures LLC, which is wholly-owned by Mr. Stern, (vi) 1,000,000 shares held by AKS Family Foundation and (vii) 3,589,483 shares of common stock held by AKS Family Partners. Does not include 41,084 shares of common stock underlying options that are not exercisable within sixty days of March 15, 2017.

(8) Includes 838,900 shares of common stock issuable upon exercise of options that are exercisable within sixty days of March 15, 2017. Does not include 186,100 shares of common stock underlying options that are not exercisable within sixty days of March 15, 2017.

(9) Includes 265,005 shares of common stock issuable upon exercise of options that are exercisable within sixty days of March 15, 2017. Does not include 139,995 shares of common stock underlying options that are not exercisable within sixty days of March 15, 2017.

(10) Includes 1,041,000 shares of common stock issuable upon exercise of options that are exercisable within 60 days of March 15, 2017. Does not include 584,001 shares of common stock underlying options that are not exercisable within sixty days of March 15, 2017.

(11) Includes 380,586 shares of common stock issuable upon exercise of options that are exercisable within sixty days of March 15, 2017. Does not include 519,414 shares of common stock underlying options that are not exercisable within sixty days of March 15, 2017.

(12) Includes 249,371 shares of common stock issuable upon exercise of options that are exercisable within 60 days of March 15, 2017. Does not include 285,629 shares of common stock underlying options that are not exercisable within sixty days of March 15, 2017.

(13) See notes (3) through (12).

Equity Compensation Plan Information

The following table provides information with respect to our compensation plans under which equity compensation was authorized as of December 31, 2016.

Plan category	Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)	Weighted average exercise price of outstanding options, warrants and rights (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column a) (c) ⁽²⁾
Equity compensation plans approved by security holders ⁽¹⁾	9,325,393	\$ 0.85	2,503,519

(1) The amounts shown in this row include securities under the Matinas BioPharma Holdings, Inc. Amended and Restated 2013 Equity Incentive Plan (the "2013 Plan").

(2) In accordance with the "evergreen" provision in our 2013 Plan, an additional 2,326,380 shares were automatically made available for issuance on the first trading day of 2017, which represents 4% of the number of shares outstanding on December 31, 2016; these shares are excluded from this calculation.

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

Certain Relationships and Related Party Transactions

Other than compensation arrangements for our named executive officers and directors, we describe below each transaction or series of similar transactions, since January 1, 2014, to which we were a party or will be a party, in which:

- the amounts involved exceeded or will exceed \$100,000; and
- any of our directors, executive officers or holders of more than 5% of our capital stock, or any member of the immediate family of the foregoing persons, had or will have a direct or indirect material interest.

Consulting Agreement

We entered into a consulting agreement with the Placement Agent in July 2013. The consulting agreement had a term of 12 months pursuant to which we paid the Placement Agent \$20,000 per month. Under the terms of the consulting agreement, the Placement Agent agreed to provide customary financial advisory services as reasonably requested by us, including consulting services for financing and capital markets activity, mergers, acquisitions, joint ventures and licensing agreements. This consulting agreement terminated on July 30, 2014.

Warrant Tender Offer

In January 2017, we completed a warrant tender offer. We had filed a Schedule TO pursuant to which it offered, or the Offer to Amend and Exercise to amend certain outstanding warrants, or the Original Warrants to purchase an aggregate of 36,728,612 shares of common stock to: (i) reduce the exercise price of the Original Warrants to \$0.50 per share of common stock in cash, (ii) shorten the exercise period of the Original Warrants so that they expire concurrently with the expiration of the Offer to Amend and Exercise at 5:00 p.m. (Eastern Time) on January 13, 2017, as may be extended by the Company in its sole discretion, or the Expiration Date, (iii) restrict the ability of the holder of shares issuable upon exercise of the Amended Warrants to sell, make any short sale of, loan, grant any option for the purchase of, or otherwise dispose of any of such shares without the prior written consent of the Company for a period of six months after the Expiration Date, or the Lock-Up Period; and (iv) provide that a holder, acting alone or with others, will agree not to effect any purchases or sales of any securities of the Company in any "short sales" as defined in Rule 200 promulgated under Regulation SHO under the Securities Exchange Act of 1934, as amended, or any type of direct and indirect stock pledges, forward sale contracts, options, puts, calls, short sales, swaps, "put equivalent positions" (as defined in Rule 16a-1(h) under the Exchange Act) or similar arrangements, or sales or other transactions through non-U.S. broker dealers or foreign regulated brokers through the expiration of the Lock-Up Period.

The Offer to Amend and Exercise expired at 5:00 p.m. Eastern Time on January 13, 2017. Pursuant to the Offer to Amend and Exercise, an aggregate of 30,966,350 Original Warrants were tendered by their holders and were amended and exercised in connection therewith for an aggregate exercise price of approximately \$15.5 million, including the following: 3,750,000 Formation Warrants; 754,000 Merger Warrants; 7,243,750 2013 Investor Warrants; 500,000 Private Placement Warrants; 14,750,831 2015 Investor Warrants; 722,925 \$2.00 PA Warrants (of which 721,987 were exercised on a cashless basis); 1,426,687 \$1.00 PA Warrants (of which 1,424,812 were exercised on a cashless basis); and 1,818,157 \$0.75 PA Warrants (of which 1,774,017 were exercised on a cashless basis). The gross cash proceeds from such exercises were approximately \$13.5 million and the net cash proceeds after deducting warrant solicitation agent fees and other estimated offering expenses were approximately \$12.7 million. Prior to the Offer to Amend and Exercise, the Company had 58,159,495 shares of common stock outstanding and warrants to purchase an aggregate of 40,255,234 shares of common stock. Following the Offer to Amend and Exercise, the Company had 87,310,154 shares of common stock outstanding and warrants to purchase an aggregate of 9,288,884 shares of common stock.

Certain of our officers, directors and holders of more than 5% of our capital stock participated in the Offer to Amend and Exercise as set forth below.

Name	Number of Shares Purchased in Offer to Amend and Exercise	Aggregate Purchase Price Paid
GJG Life Sciences, LLC	3,516,711	\$ 1,758,356
Roelof Rongen	50,000	25,000
Herbert Conrad	1,875,000	937,500
Adam Stern and affiliated entities	4,216,492(1)	1,025,000
Stefano Ferrari	4,000	2,000
James Scibetta	100,000	50,000
	20,000	10,000
Gary Gaglione		
Douglas Kling	40,000	20,000

(1) Includes 2,166,492 placement agent warrants which were exercised on a "cashless basis".

We retained Aegis Capital Corp. to act as its Warrant Agent for the Offer to Amend and Exercise pursuant to a Warrant Agent Agreement. Aegis Capital received a fee equal to 5% of the cash exercise prices paid by holders of the Original Warrants (excluding the placement agent warrants) who participated in the Offer to Amend and Exercise. In addition, we agreed to reimburse Aegis Capital for its reasonable out-of-pocket expenses and attorney's fees, including a \$35,000 non-accountable expense allowance.

Voting Agreement

In connection with the initial closing of the 2013 Private Placement, the stockholders of Matinas BioPharma, Inc. (“Matinas BioPharma”) prior to the 2013 Merger (as defined below) and the 2013 Private Placement (the “Matinas Stockholders”) and the stockholders of the Company prior to the Merger (the “Company Stockholders”), entered into a Voting Agreement (the “Voting Agreement”). Pursuant to the terms of the Voting Agreement, (i) the Matinas Stockholders have the right to nominate four (4) members to our Board (the “Matinas Stockholders’ Nominees”), (ii) the Company Stockholders will vote in favor of the election and removal of the Matinas Stockholders’ Nominees and (iii) the Company Stockholders shall nominate the Aegis Nominee to our Board and (iv) the Matinas Stockholders shall vote in favor of the election and removal of the Aegis Nominee. The Voting Agreement expired on July 11, 2016.

2016 Private Placement

In the third quarter of 2016, we completed a private placement, or the 2016 Private Placement, pursuant to which we sold to accredited investors an aggregate of 1,600,000 shares of Series A Preferred Stock at a purchase price of \$5.00 per share, for aggregate gross proceeds to us of \$8.0 million. Certain of our officers, directors and holders of more than 5% of our capital stock purchased shares of Series A Preferred Stock in the 2016 Private Placement as set forth below.

Name	Number of Series A Preferred Shares Purchased	Aggregate Purchase Price Paid
GJG Life Sciences, LLC	490,000	\$ 2,450,000
Laurence G. Allen and affiliated entities	30,000	150,000
Herbert Conrad	20,000	100,000
Adam Stern and affiliated entities	20,000	100,000

We entered into a Placement Agency Agreement with Aegis Capital Corp. pursuant to which Aegis acted as our exclusive placement agent for the 2016 Private Placement. Immediately prior to the 2016 Private Placement, the Placement Agent and its affiliates beneficially owned an aggregate of more than 10% of our outstanding equity securities. In addition, Adam Stern, Head of Private Equity Banking at Aegis, is a member of our board of directors. Pursuant to the terms of the Placement Agency Agreement, in connection with the 2016 Private Placement, we paid the Placement Agent an aggregate cash fee of \$800,000 and non-accountable expense allowance of \$240,000 and have issued to the Placement Agent warrants to purchase 1,600,000 shares of common stock at \$0.50 per share. The warrants provide for a cashless exercise feature and are exercisable for a period of five years from the date of closing. We have also agreed to pay the Placement Agent similar cash and warrant compensation with respect to, and based on, any individual or entity that the Placement Agent solicits interest from in connection with this Offering, excluding our existing stockholders and certain other specified investors, who subsequently invests in us at any time prior to the date that is twelve (12) months following the final Closing of this Offering. In addition, we entered into a three year, non-exclusive finder’s fee agreement with the Placement Agent providing that if the Placement Agent shall introduce us to a third party that consummates certain types of transactions with our Company, such as business combinations, joint ventures and licensing arrangements, then the Placement Agent will be paid a finder’s fee, payable in cash at the closing of such transaction, equal to (a) 5% of the first \$1,000,000 of the consideration paid in such transaction; plus (b) 4% of the next \$1,000,000 of the consideration paid in such transaction; plus (c) 3% of the next \$5,000,000 of the consideration paid in the such transaction; plus (d) 2.5% of any consideration paid in such transaction in excess of \$7,000,000. Further, we have granted the Placement Agent, the irrevocable preferential right of first refusal to act as co-manager for any proposed public or private offering of our securities where we utilize a third party placement agent or underwriter, which right of first refusal expires September 12, 2017.

2015 Private Placement

In March and April 2015, we completed a private placement, or the 2015 Private Placement, pursuant to which we sold to accredited investors an aggregate of 20,000,000 units at a price of \$0.50 per unit, with each unit consisting of: (i) one share of our common stock, and (ii) a five-year warrant to purchase one share of common stock at an exercise price of \$0.75 per share (the “2015 Investor Warrants”). The gross proceeds to us from the 2015 Private Placement were \$10.0 million. Certain of our officers, directors and holders of more than 5% of our capital stock purchased units in the 2015 Private Placement as set forth below.

Name	Number of Units Purchased	Aggregate Purchase Price Paid
GJG Life Sciences, LLC	3,935,880	\$ 1,967,940
Laurence G. Allen and affiliated entities	1,200,000	600,000
Herbert Conrad	1,000,000	500,000
Adam Stern and affiliated entities	800,000	400,000
James Scibetta	100,000	50,000
Roelof Rongen	50,000	25,000
Douglas Kling	40,000	20,000
Gary Gaglione	20,000	10,000

We entered into a Placement Agency Agreement with Aegis Capital Corp. pursuant to which Aegis acted as our exclusive placement agent for the 2015 Private Placement. Immediately prior to the 2015 Private Placement, the Placement Agent and its affiliates beneficially owned an aggregate of more than 10% of our outstanding equity securities. In addition, Adam Stern, Head of Private Equity Banking at Aegis, is a

member of our board of directors. Pursuant to the terms of the Placement Agency Agreement, in connection with the 2015 Private Placement, we paid the Placement Agent an aggregate cash fee of \$1,000,000 and non-accountable expense allowance of \$300,000 and have issued to the Placement Agent warrants (substantially similar to the 2015 Investor Warrants) to purchase 2,000,000 shares of common stock at \$0.50 per share and additional warrants to purchase 2,000,000 shares of common stock at \$0.75 per share. In addition, we agreed to engage the Placement Agent as our warrant solicitation agent in the event the 2015 Investor Warrants are called for redemption and shall pay a warrant solicitation fee to the Placement Agent equal to five (5%) percent of the amount of funds solicited by the Placement Agent upon the exercise of the 2015 Investor Warrants following such redemption.

Vendor Agreement

Since January 1, 2011, we have submitted orders for the purchase of an omega-3 fatty acid concentrate from KD-Pharma Bexbach GmbH, or KD Pharma. For the years ended December 31, 2014, December 31, 2015 and December 31, 2016, these orders totaled \$258 thousand, \$46 thousand and \$0 respectively. Mr. Ferrari, a member of our board, is the brother of a part owner of the holding company that owns KD Pharma.

Indemnification Agreements

We entered into indemnification agreements with our directors and executive officers. The indemnification agreements provide for indemnification against expenses, judgments, fines and penalties actually and reasonably incurred by an indemnitee in connection with threatened, pending or completed actions, suits or other proceedings, subject to certain limitations. The indemnification agreements also provide for the advancement of expenses in connection with a proceeding prior to a final, nonappealable judgment or other adjudication, provided that the indemnitee provides an undertaking to repay to us any amounts advanced if the indemnitee is ultimately found not to be entitled to indemnification by us. The indemnification agreement set forth procedures for making and responding to a request for indemnification or advancement of expenses, as well as dispute resolution procedures that apply to any dispute between us and an indemnitee arising under the Indemnification Agreements.

Policies and Procedures for Related Party Transactions

We have adopted a policy that our executive officers, directors, nominees for election as a director, beneficial owners of more than 5% of any class of our common stock, any members of the immediate family of any of the foregoing persons and any firms, corporations or other entities in which any of the foregoing persons is employed or is a partner or principal or in a similar position or in which such person has a 5% or greater beneficial ownership interest, which we refer to collectively as related parties, are not permitted to enter into a transaction with us without the prior consent of our board of directors acting through the audit committee or, in certain circumstances, the chairman of the audit committee. Any request for us to enter into a transaction with a related party, in which the amount involved exceeds \$100,000 and such related party would have a direct or indirect interest must first be presented to our audit committee, or in certain circumstances the chairman of our audit committee, for review, consideration and approval. In approving or rejecting any such proposal, our audit committee, or the chairman of our audit committee, is to consider the material facts of the transaction, including, but not limited to, whether the transaction is on terms no less favorable than terms generally available to an unaffiliated third party under the same or similar circumstances, the extent of the benefits to us, the availability of other sources of comparable products or services and the extent of the related party's interest in the transaction.

Director Independence

Based on information requested from and provided by each of our directors, our board of directors has determined that Messrs. Herbert Conrad, Stefano Ferrari and James Scibetta are “independent directors” as such term is defined in the rules of The NYSE MKT’s corporate governance requirements and Rule 10A-3 promulgated under the Securities Exchange Act of 1934, as amended.

Item 14. Principal Accounting Fees And Services

The following table represents aggregate fees billed to the Company for the fiscal years ended December 31, 2016 and December 31, 2015, by EisnerAmper LLP, the Company’s independent registered public accounting firm.

	Year Ended December 31,	
	2016	2015
	(in thousands)	
Audit Fees	\$ 90	\$ 100
Tax Fees	8	9
Total Fees	<u>\$ 98</u>	<u>\$ 109</u>

Audit Fees consist of fees for professional services and expenses relating to the audit of our annual financial statements, the audit of our internal control over financial reporting and the review of our quarterly financial information.

Tax Fees are for tax-related services related primarily to tax consulting and tax planning.

The Audit Committee pre-approves all auditing services and any non-audit services that the independent registered public accounting firm is permitted to render under Section 10A (h) of the Exchange Act. The Audit Committee may delegate the pre-approval to one of its members, provided that if such delegation is made, the full Audit Committee must be presented at its next regularly scheduled meeting with any pre-approval decision made by that member.

PART IV

Item 15. Exhibits And Financial Statement Schedules

Exhibit No.	Description
2.1	Merger Agreement, dated July 11, 2013, by and among the Company, Matinas Merger Sub, Inc., and Matinas BioPharma, Inc. (incorporated by reference to Exhibit 2.1 to Amendment No. 1 to the Company’s Registration Statement on Form S-1 filed with the SEC on February 7, 2014).
2.2	Agreement and Plan of Merger (the “Merger Agreement”) with Aquarius Biotechnologies, Inc., a Delaware corporation (“Aquarius”), Saffron Merger Sub, Inc., a Delaware corporation and a wholly-owned subsidiary of the Company (“Merger Sub”) and J. Carl Craft, as the stockholder representative (incorporated herein by reference to Exhibit 2.1 to the Company’s Current Report on Form 8-K filed with the SEC on January 30, 2015).
3.1	Certificate of Incorporation (incorporated by reference to Exhibit 3.1 to Amendment No. 1 to the Company’s Registration Statement on Form S-1 filed with the SEC on February 7, 2014).
3.2	Bylaws (incorporated by reference to Exhibit 3.2 to Amendment No. 1 to the Company’s Registration Statement on Form S-1 filed with the SEC on February 7, 2014).

- 3.3 Certificate of Amendment, dated October 29, 2015 to Certificate of Incorporation. (incorporated herein by reference to the Company's Current Report on Form 8-K filed with the SEC on November 5, 2015).
- 3.4 Certificate of Designation of Series A Preferred Stock (incorporated by reference to Exhibit 3.1 of the Company's Current Report on Form 8-K filed August 1, 2016 with the Securities and Exchange Commission)
- 4.1 Common Stock Specimen*
- 4.2 Form of Warrant (incorporated by reference to Exhibit 4.1 to Amendment No. 1 to the Company's Registration Statement on Form S-1 filed with the SEC on February 7, 2014).
- 4.3 Form of Placement Agent Warrant (incorporated by reference to Exhibit 4.2 to Amendment No. 1 to the Company's Registration Statement on Form S-1 filed with the SEC on February 7, 2014).
- 4.4 Registration Rights Agreement dated July 30, 2013 (incorporated by reference to Exhibit 4.3 to Amendment No. 1 to the Company's Registration Statement on Form S-1 filed with the SEC on February 7, 2014).
- 4.5 Form of 2015 Investor Warrant. (incorporated by reference to Exhibit 4.4 to the post-effective amendment No. 1 to Form S-1 filed with the SEC on April 17, 2015.)
- 4.6 Form of 2015 Placement Agent Warrant. (incorporated by reference to Exhibit 4.5 to the post-effective amendment No. 1 to Form S-1 filed with the SEC on April 17, 2015.)
- 4.7 Registration Rights Agreement dated March 31, 2015 between the Company and the investors named therein. (incorporated by reference to Exhibit 4.6 to the post-effective amendment No. 1 to Form S-1 filed with the SEC on April 17, 2015.)
- 4.8 Form of 2016 Placement Agent Warrant (incorporated by reference to Exhibit 4.7 to the Registration Statement on Form S-1 filed with the SEC on November 2, 2016.)
- 10.1 Voting Agreement, dated July 30, 2013, by and among the Company and the stockholders named therein. (incorporated by reference to Exhibit 10.5 to Amendment No. 1 to the Company's Registration Statement on Form S-1 filed with the SEC on February 7, 2014).
- 10.2 Matinas BioPharma Holdings, Inc. Amended and Restated 2013 Equity Compensation Plan (incorporated herein by reference to Exhibit 10.6 to the Company's Annual Report on Form 10-K filed on March 31, 2015.) †
- 10.3 Form of Incentive Stock Option Agreement (incorporated by reference to Exhibit 10.7 to Amendment No. 1 to the Company's Registration Statement on Form S-1 filed with the SEC on February 7, 2014). †
- 10.4 Form of Non-Qualified Stock Option Agreement (incorporated by reference to Exhibit 10.8 to Amendment No. 1 to the Company's Registration Statement on Form S-1 filed with the SEC on February 7, 2014). †
- 10.9 Employment Agreement, dated July 30, 2013, between the Company and Roelof Rongen (incorporated by reference to Exhibit 10.9 to Amendment No. 1 to the Company's Registration Statement on Form S-1 filed with the SEC on February 7, 2014). †
- 10.10 Employment Agreement, dated July 30, 2013, between the Company and Abdel A. Fawzy. (incorporated by reference to Exhibit 10.11 to Amendment No. 1 to the Company's Registration Statement on Form S-1 filed with the SEC on February 7, 2014). †
- 10.11 Employment Agreement effective as of October 4, 2013 between the Company and Jerome Jabbour (incorporated by reference to Exhibit 10.12 to Amendment No. 1 to the Company's Registration Statement on Form S-1 filed with the SEC on February 7, 2014). †
- 10.12 Offer Letter, dated October 31, 2013, between the Company and Gary Gaglione (incorporated by reference to Exhibit 10.13 to Amendment No. 1 to the Company's Registration Statement on Form S-1 filed with the SEC on February 7, 2014). †
- 10.13 Form of Indemnification Agreement (incorporated by reference to Exhibit 10.14 to Amendment No. 1 to the Company's Registration Statement on Form S-1 filed with the SEC on February 7, 2014). †

- 10.14 Lease, effective as of November 4, 2013, by and between the company and A-K Bedminster Associates, L.P. (incorporated by reference to Exhibit 10.17 to Amendment No. 1 to the Company's Registration Statement on Form S-1 filed with the SEC on February 7, 2014).
- 10.15 Amended and Restated Exclusive License Agreement dated as of January 29, 2015, by and between Rutgers, the State University of New Jersey and Aquarius Biotechnologies, Inc. (incorporated herein by reference to Exhibit 10.18 to the Company's Annual Report on Form 10-K filed on March 31, 2015.) +.
- 10.16 Employment Agreement, dated March 12, 2015, between Matinas BioPharma Holdings, Inc. and Douglas F. Kling. (incorporated herein by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed with the SEC on March 19, 2015). †
- 10.17 Placement Agency Agreement dated March 19, 2015 between the Company and Aegis Capital Corp. (incorporated herein by reference to Exhibit 10.20 of the Company's Registration Statement on Form S-1 (Reg. No. 333-193455), filed with the SEC on April 17, 2015).
- 10.18 Form of Subscription Agreement for the Company's 2015 private placement. (incorporated herein by reference to Exhibit 10.21 of the Company's Registration Statement on Form S-1 (Reg. No. 333-193455), filed with the SEC on April 17, 2015).
- 10.19 Employment Agreement, dated September 1, 2015, between Matinas Biopharma Holdings, Inc. and Raphael J. Mannino. (incorporated herein by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed with the SEC on September 1, 2015).
- 10.20 Separation and Consulting Agreement between George Bobotas and Matinas BioPharma Holdings, Inc., dated September 29, 2015. (incorporated herein by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed with the SEC on October 1, 2015).
- 10.21 Placement Agency Agreement dated June 27, 2016 by and between Matinas BioPharma Holdings, Inc. and Aegis Capital Corp. (incorporated by reference to Exhibit 10.21 to the Registration Statement on Form S-1 filed with the SEC on November 2, 2016.)
- 10.22 Finder's Agreement dated July 29, 2016 by and between Matinas BioPharma Holdings, Inc. and Aegis Capital Corp. (incorporated by reference to Exhibit 10.22 to the Registration Statement on Form S-1 filed with the SEC on November 2, 2016.)
- 10.23 Employment Agreement, dated March 22, 2017, between Matinas Biopharma Holdings, Inc. and Roelof Rongen†*
- 10.24 Employment Agreement, dated March 22, 2017, between Matinas Biopharma Holdings, Inc. and Abdel Fawzy†*
- 21.1 Subsidiaries Index*
- 23.1 Consent of EisnerAmper LLP*
- 31.1 Certification of President and Chief Executive Officer Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002*
- 31.2 Certification of Acting Chief Financial Officer Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002*
- 32.1 Section 1350 Certifications**
- 101 The following financial information from the Annual Report on Form 10-K for the fiscal year ended December 31, 2016, formatted in XBRL (eXtensible Business Reporting Language), is filed electronically herewith: (i) Consolidated Balance Sheets as of December 31, 2016 and 2015; (ii) Consolidated Statements of Operations and Comprehensive Loss for the Years Ended December 31, 2016 and 2015; (iii) Consolidated Statement of Changes in Stockholders' Equity (Deficit) for the Years Ended December 31, 2016 and 2015; (iv) Consolidated Statements of Cash Flows for the Years Ended December 31, 2016 and 2015; and (v) Notes to Consolidated Financial Statements.*

+ Confidential treatment has been requested for certain provisions of this Exhibit pursuant to Rule 24b-2 promulgated under the Securities Exchange Act of 1934, as amended.

† Indicates a management contract or compensation plan, contract or arrangement.

* Filed herewith.

** Furnished herewith.

Item 16. Form 10-K Summary.

None.

SIGNATURES

Pursuant to the requirements of the Securities Act, the registrant has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the city of Bedminster, State of New Jersey on March 31, 2017.

MATINAS BIOPHARMA HOLDINGS, INC.

By: /s/ Roelof Rongen
Name: Roelof Rongen
Title: Chief Executive Officer

By: /s/ Gary Gaglione
Name: Gary Gaglione
Title: Acting Chief Financial Officer

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

<u>Person</u>	<u>Capacity</u>	<u>Date</u>
<u>/s/ Roelof Rongen</u> Roelof Rongen	Chief Executive Officer and Director (Principal Executive Officer)	March 31, 2017
<u>/s/ Gary Gaglione</u> Gary Gaglione	Acting Chief Financial Officer (Principal Financial and Accounting Officer)	March 31, 2017
<u>/s/ Herbert Conrad</u> Herbert Conrad	Chairman of the Board	March 31, 2017
<u>/s/ Stefano Ferrari</u> Stefano Ferrari	Director	March 31, 2017
<u>/s/ James S. Scibetta</u> James S. Scibetta	Director	March 31, 2017
<u>/s/ Adam K. Stern</u> Adam K. Stern	Director	March 31, 2017

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The Board of Directors and Stockholders of
Matinas BioPharma Holdings, Inc.

We have audited the accompanying consolidated balance sheets of Matinas BioPharma Holdings, Inc. and Subsidiaries (the "Company") as of December 31, 2016 and 2015, and the related consolidated statements of operations, stockholders' equity, and cash flows for each of the years in the two-year period ended December 31, 2016. The financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. Our audits included consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, 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. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the consolidated financial position of Matinas BioPharma Holdings, Inc. and Subsidiaries as of December 31, 2016 and 2015, and the consolidated results of their operations and their cash flows for each of the years in the two-year period ended December 31, 2016, in conformity with accounting principles generally accepted in the United States of America.

/s/ EisnerAmper LLP

Iselin, New Jersey
March 31, 2017

Matinas BioPharma Holdings Inc.
Consolidated Balance Sheets

	<u>December 31,</u> <u>2016</u>	<u>December 31,</u> <u>2015</u>
ASSETS		
CURRENT ASSETS		
Cash and cash equivalents	\$ 4,105,451	\$ 3,226,997
Restricted cash	155,610	100,326
Prepaid expenses	<u>304,427</u>	<u>231,797</u>
Total current assets	4,565,488	3,559,120
Equipment - net	356,143	377,723
In-process research and development	3,017,377	3,017,377
Goodwill	1,336,488	1,336,488
Other assets, including long term security deposit	<u>540,845</u>	<u>115,370</u>
TOTAL ASSETS	<u>\$ 9,816,341</u>	<u>\$ 8,406,078</u>
LIABILITIES AND STOCKHOLDERS' EQUITY		
CURRENT LIABILITIES		
Accounts payable	\$ 475,602	\$ 497,842
Note payable	118,046	-
Accrued expenses	829,724	610,206
Deferred rent liability	11,485	9,225
Lease liability	<u>9,936</u>	<u>11,261</u>
Total current liabilities	<u>1,444,793</u>	<u>1,128,534</u>
LONG TERM LIABILITIES		
Deferred tax liability	1,205,141	1,205,141
Lease liability - net of current portion	<u>16,446</u>	<u>-</u>
TOTAL LIABILITIES	2,666,380	2,333,675
Commitments	-	-
STOCKHOLDERS' EQUITY		
Convertible preferred stock, stated value \$5.00 per share, Authorized amount issued and outstanding 1,600,000 and 0 shares as of December 31, 2016 and December 31, 2015, respectively (liquidation preference – \$8,000,000 at December 31, 2016) Net of issuance costs.	6,086,350	-
Common stock, par value \$0.0001 per share, 250,000,000 and 250,000,000 shares authorized at December 31, 2016 and December 31, 2015, respectively; 58,159,495 issued and outstanding as of December 31, 2016; 57,180,148 issued and outstanding as of December 31, 2015	5,817	5,719
Additional paid in capital	36,237,504	29,253,848
Accumulated deficit	<u>(35,179,710)</u>	<u>(23,187,164)</u>
Total stockholders' equity	<u>7,149,961</u>	<u>6,072,403</u>
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	<u>\$ 9,816,341</u>	<u>\$ 8,406,078</u>

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

Matinas BioPharma Holdings, Inc.
Consolidated Statements of Operations

	For the Year Ended	
	December 31,	
	2016	2015
Revenue:		
Contract research revenue	\$ -	\$ 194,494
Costs and Expenses:		
Research and development	3,947,644	5,292,193
General and administrative	4,309,489	4,813,800
Total costs and expenses	<u>8,257,133</u>	<u>10,105,993</u>
Loss from operations	(8,257,133)	(9,911,499)
Sale of New Jersey net operating loss	674,901	756,472
Other income/(expense), net	<u>(16,505)</u>	<u>19,627</u>
Net loss	\$ (7,598,737)	\$ (9,135,400)
Convertible preferred stock beneficial conversion feature accreted as a deemed dividend	<u>(4,393,809)</u>	<u>-</u>
Net loss attributable to common shareholders	<u>\$ (11,992,546)</u>	<u>\$ (9,135,400)</u>
Net loss available for common shareholders per share - basic and diluted	\$ (0.21)	\$ (0.18)
Weighted average common shares outstanding:		
Basic and diluted	<u>57,654,830</u>	<u>51,481,002</u>

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

MATINAS BIOPHARMA HOLDINGS, INC.
CONSOLIDATED STATEMENT OF STOCKHOLDERS' EQUITY
December 31, 2016

	Convertible Preferred Stock		Common Stock		Additional Paid - in Capital	Accumulated Deficit	Total Stockholders' Equity
	(Shares)	(Amount)	(Shares)	(Amount)			
Balance at December 31, 2013	-	\$ -	32,000,000	\$ 3,200	\$ 14,302,307	\$ (3,830,719)	\$ 10,474,788
Stock Based Compensation	-	-	-	-	1,821,402	-	1,821,402
Issuance of Common Stock for services	-	-	292,650	30	152,721	-	152,751
Net Loss for the year ended December 31, 2014	-	-	-	-	-	(10,221,045)	(10,221,045)
Balance at December 31, 2014	-	-	32,292,650	3,230	16,276,430	(14,051,764)	2,227,896
Shares issued for Aquarius Inc. Purchase January 29, 2015	-	-	4,608,020	460	2,119,229	-	2,119,689
Aquarius Inc. Contingent Equity Consideration	-	-	-	-	753,346	-	753,346
Private Placements	-	-	20,000,000	2,001	8,520,163	-	8,522,164
Private Placement Issuance Costs	-	-	-	-	(7,945)	-	(7,945)
Stock Based Compensation	-	-	-	-	1,354,373	-	1,354,373
Issuance of Common Stock as Compensation for services	-	-	278,784	28	237,967	-	237,995
Issuance of Common Stock for exercised options	-	-	694	-	285	-	285
Net Loss for the year ended December 31, 2015	-	-	-	-	-	(9,135,400)	(9,135,400)
Balance as of December 31, 2015	-	\$ -	57,180,148	\$ 5,719	\$ 29,253,848	\$ (23,187,164)	\$ 6,072,403
Stock Based Compensation	-	-	463,266	46	1,218,897	-	1,218,943
Issuance of Common Stock as Compensation for services	-	-	-	-	299,954	-	299,954
Issuance of Common Stock in exchange for warrants	-	-	516,081	52	314,949	-	315,001
Issuance of Series A Preferred Shares and warrants	1,600,000	6,086,350	-	-	1,913,650	-	8,000,000
Preferred Stock Issuance Costs	-	-	-	-	(1,157,603)	-	(1,157,603)
Beneficial conversion feature accredited as deemed dividend	-	-	-	-	4,393,809	(4,393,809)	-
Net Loss for the year ended December 31, 2016	-	-	-	-	-	(7,598,737)	(7,598,737)
Balance as of December 31, 2016	<u>1,600,000</u>	<u>\$ 6,086,350</u>	<u>58,159,495</u>	<u>\$ 5,817</u>	<u>\$ 36,237,504</u>	<u>\$ (35,179,710)</u>	<u>\$ 7,149,961</u>

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

Matinas BioPharma Holdings Inc.
Consolidated Statements of Cash Flow

	Year Ended December 31,	
	2016	2015
Cash flows from operating activities:		
Net loss	\$ (7,598,737)	\$ (9,135,400)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	52,644	43,502
Deferred rent	2,260	9,225
Share based compensation expense	1,518,897	1,592,367
Changes in operating assets and liabilities, net of amounts acquired:		
Grant receivable	-	45,643
Prepaid expenses	189,694	(111,588)
Other assets	(480,759)	100,621
Accounts payable	(22,240)	(73,726)
Accrued expenses - other liabilities	219,518	(285,047)
Net cash used in operating activities	<u>(6,118,723)</u>	<u>(7,814,403)</u>
Cash flows from investing activities:		
Equipment purchases	-	(76,179)
Acquisition of Aquarius, net of cash acquired	-	70,754
Net cash used in investing activities	<u>-</u>	<u>(5,425)</u>
Cash flows from financing activities:		
Proceeds from issuance of preferred shares and warrants	8,000,000	-
Preferred stock issuance cost	(1,157,603)	-
Proceeds from common stock issued for cash	-	10,000,000
Common stock issuance cost	-	(1,485,496)
Proceeds from exercise of warrants	315,001	-
Payment capital lease liability	(15,943)	(48,392)
Payment of note payable	(144,278)	(10,000)
Net cash provided by financing activities	<u>6,997,177</u>	<u>8,456,112</u>
Net increase in cash and cash equivalents	878,454	636,284
Cash and cash equivalents at beginning of year	3,226,997	2,590,713
Cash and cash equivalents at end of year	<u>\$ 4,105,451</u>	<u>\$ 3,226,997</u>
Supplemental non-cash financing and investing activities:		
Stock consideration for Aquarius merger	\$ -	\$ 2,119,689
Deemed dividend for convertible preferred stock beneficial conversion feature	\$ 4,393,809	\$ -
Note Payable for insurance premiums	\$ 262,324	\$ -
Equipment acquired under capital lease	\$ 31,064	\$ -
Contingent equity consideration for Aquarius merger	\$ -	\$ 753,346

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

MATINAS BIOPHARMA HOLDINGS, INC.
Notes to Financial Statements
(tabular dollars and shares in thousands, except per share data)

NOTE A – Nature of Business

[1] Corporate History

Matinas BioPharma Holdings Inc. (“Holdings”) is a Delaware corporation formed in 2013. Holdings is the parent company of Matinas BioPharma, Inc. (“BioPharma”), and Matinas BioPharma Nanotechnologies, Inc. (“Nanotechnologies,” formerly known as Aquarius Biotechnologies, Inc.), its operating subsidiaries (“Aquarius”, and together with “Holdings” and “BioPharma”, “the Company” or “we” or “our” or “us”). The Company is a development stage biopharmaceutical company with a focus on identifying and developing novel pharmaceutical products.

On January 29, 2015, we completed the acquisition of Aquarius (Aquarius Merger), a New Jersey-based, early-stage pharmaceutical company focused on the development of differentiated and orally delivered therapeutics based on a proprietary, lipid-based, drug delivery platform called “cochleate delivery technology.” Following the Aquarius Merger, we are a clinical-stage biopharmaceutical company focused on identifying and developing safe and effective broad spectrum antifungal and anti-bacterial therapeutics for the treatment of serious and life-threatening infections, using our innovative lipid-crystal nano-encapsulation drug delivery platform. See Note D for additional information on this transaction.

On April 10, 2015, we completed a private placement (“2015 Private Placement”), under which the Company sold an aggregate of 20,000,000 shares of common stock and warrants to purchase 20,000,000 shares of common stock (see Note E for additional details) resulting in net proceeds of approximately \$8.5 million after offering expenses.

On September, 13, 2016, the Company announced the final closing of an \$8.0 million private placement equity financing, which represents the full amount of the offering. The Company sold to accredited investors an aggregate of 1,600,000 Series A Preferred Shares at a purchase price of \$5.00 per share resulting in net proceeds of approximately \$6.9 million (see Note E for additional details).

[2] Proprietary Products and Technology Portfolios

We currently have two clinical-stage products designed for the treatment of infectious disease. Our lead product candidate is MAT 2203, a novel oral formulation of a broad spectrum anti-fungal drug called amphotericin B which uses our cochleate delivery technology. We are currently screening and enrolling patient in a Phase 2a study of MAT2203 in collaboration with the National Institute of Allergy and Infectious Diseases, or NIAID, of the National Institutes of Health, or NIH. In the third quarter of 2016, the NIH commenced dosing patients in this Phase 2a study and, assuming the NIH meets the anticipated clinical timelines, we anticipate announcing results of this study during the first half of 2017. In addition to the Phase 2a study being conducted by the NIH, we commenced a second Phase 2 study in patients with vulvovaginal candidiasis during the fourth quarter of 2016, with results anticipated late in the first half of 2017.

Our second clinical stage product candidate is MAT2501, an orally administered, encochleated formulation of the broad spectrum aminoglycoside antibiotic amikacin which may be used to treat different types of multidrug-resistant bacteria, including non-tubercular mycobacterial infections (NTM), as well as various multidrug-resistant gram negative and intracellular bacterial infections.

We are also exploring the development of MAT2501 for the treatment of a variety of serious and acute bacterial infections, including the treatment of gram negative bacterial infections, currently the most significant unmet medical need identified by infectious disease specialists. We recently filed an Investigational New Drug (IND) application with FDA and were cleared to commence Phase 1 clinical studies in January 2016. We have initiated the first Phase 1 study of MAT2501 during the fourth quarter of 2016.

We are currently exploring strategic partnering options for our legacy cardiovascular drug, MAT9001, which has been developed and targeted to date for the treatment of very high triglycerides and MAT8800, our discovery program seeking to identify product candidates derived from omega-3 fatty acids for the treatment of non-alcoholic fatty liver disease.

NOTE B - Going Concern and Plan of Operation

The accompanying financial statements have been prepared in conformity with generally accepted accounting principles, which contemplate continuation of the Company as a going concern.

The Company has experienced net losses and negative cash flows from operations each period since its inception. Through December 31, 2016, the Company had an accumulated deficit of approximately \$35.2 million. The Company's operations have been financed primarily through the sale of equity securities. The Company's net loss for the year ended December 31, 2016 was approximately \$7.6 million and \$9.1 million for the year ended December 31, 2015.

The Company has been engaged in developing a pipeline of product candidates since 2011. To date, the Company has not obtained regulatory approval for any of its product candidates nor generated any revenue from products and the Company expects to incur significant expenses to complete development of its product candidates. The Company may never be able to obtain regulatory approval for the marketing of any of its product candidates in any indication in the United States or internationally and there can be no assurance that the Company will generate revenues or ever achieve profitability.

Assuming the Company obtains FDA approval for one or more of its product candidates, which the Company does not expect to receive until 2021 at the earliest, the Company expects that its expenses will continue to increase once the Company reaches commercial launch. The Company also expects that its research and development expenses will continue to increase as it moves forward for other indications for its lead product candidates and diversifies its R&D portfolio. As a result, the Company expects to continue to incur substantial losses for the foreseeable future, and that these losses will be increasing.

The Company will need to secure additional capital in order to fund operations and to continue and complete its planned clinical and operational activities related to the product candidates and technologies that the Company recently acquired from Aquarius. The Company can provide no assurances that such additional financing will be available to the Company on acceptable terms, or at all. On January 13, 2017, the Company completed its warrant tender offer, with gross cash proceeds of \$ 13.5 million and net proceeds estimated at \$ 12.7 million (see Footnote J for additional details). The Company anticipates that current cash on hand at December 31, 2016 plus the proceeds from the warrant tender offer would be sufficient to meet its operating obligations through the second quarter of 2018.

NOTE C - Summary of Significant Accounting Policies

[1] Basis of Presentation

The accompanying consolidated financial statements include the consolidated accounts of Matinas BioPharma Holdings Inc. "Holdings" and its wholly owned subsidiaries, Matinas BioPharma Inc. and Matinas BioPharma Nanotechnologies, Inc. (formerly known as Aquarius Biotechnologies, Inc.) the operational subsidiaries of Holdings. The accompanying consolidated financial statements have been prepared by the Company in accordance with accounting principles generally accepted in the United States of America ("U.S. GAAP") and reflect the operations of the Company and its wholly-owned subsidiaries. All intercompany transactions have been eliminated in consolidation.

[2] Use of Estimates

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

Certain accounting principles require subjective and complex judgments to be used in the preparation of financial statements. Accordingly, a different financial presentation could result depending on the judgments, estimates, or assumptions that are used. Such estimates and assumptions include, but are not specifically limited to, those required in the assessment of the impairment of intangible assets and the valuation of Level 3 fair value measurement of financial instruments and determination of stock-based compensation, contingent consideration and all acquired assets and liabilities.

[3] **Cash and Cash Equivalents**

The Company considers all highly liquid instruments purchased with original maturity of three months or less to be cash equivalents to the extent the funds are not being held for investment purposes.

[4] **Concentration of Credit Risk**

The Company's financial instruments that are exposed to concentrations of credit risk consist primarily of cash and cash equivalents. Cash balances are maintained principally at one major U.S. financial institution and are insured by the Federal Deposit Insurance Corporation ("FDIC") up to regulatory limits. At all times throughout the year ended December 31, 2016, the Company's cash balances exceeded the FDIC insurance limit. The Company has not experienced any losses in such accounts.

[5] **Equipment**

Equipment is stated at cost less accumulated depreciation. Depreciation is computed using the straight-line method over the estimated useful lives of the assets. The estimated useful lives of the Company equipment ranges from three to ten years. Capitalized costs associated with leasehold improvements are amortized over the lesser of the useful life of the asset or the remaining life of the lease.

[6] **Income Taxes**

Deferred taxes are provided on a liability method whereby deferred tax assets are recognized for deductible temporary differences and operating loss and tax credit carry forwards and deferred tax liabilities are recognized for taxable temporary differences. Temporary differences are the differences between the reported amounts of assets and liabilities and their tax bases. Deferred tax assets are reduced by a valuation allowance when, in the opinion of management, it is more likely than not that some portion or all of the deferred tax assets will not be realized. Deferred tax assets and liabilities are adjusted for the effects of changes in tax laws and rates.

The Company adopted the provisions of Accounting Standard Codification 740-10 and has analyzed its filing positions in 2015 and 2014 in jurisdictions where it may be obligated to file returns. The Company believes that its income tax filing position and deductions will be sustained on audit and does not anticipate any adjustments that will result in a material change to its financial position. Therefore, no reserves for uncertain income tax positions have been recorded. The Company's policy is to recognize interest and/or penalties related to income tax matters in income tax expense. The Company had no accrual for interest or penalties as of December 31, 2016.

Since the Company incurred net operating losses in every tax year since inception, the 2013, 2014 and 2015 income tax returns are subject to examination and adjustments by the IRS for at least three years following the year in which the tax attributes are utilized.

[7] **Stock-Based Compensation**

The Company accounts for stock-based compensation to employees in conformity with the provisions of ASC Topic 718, "*Stock Based Compensation*". Stock-based compensation to employees consist of stock option grants and restricted shares that are recognized in the consolidated statement of operations based on their fair values at the date of grant.

The Company accounts for equity instruments issued to non-employees in accordance with the provisions of ASC Topic 505, subtopic 50, "*Equity-Based Payments to Non-Employees*" based upon the fair-value of the underlying instrument. The equity instruments, consisting of stock options granted to consultants, are valued using the Black-Scholes valuation model. The measurement of stock-based compensation is subject to periodic adjustments as the underlying equity instruments vest and is recognized as an expense over the period which services are received.

The Company calculates the fair value of option grants utilizing the Black-Scholes pricing model, and estimates the fair value of restricted stock based upon the estimated fair value of the common stock. The amount of stock based compensation recognized during a period is based on the value of the portion of the awards that are ultimately expected to vest. The authoritative guidance requires forfeitures to be estimated at the time stock options are granted and warrants are issued and revised. If necessary in subsequent periods, an adjustment will be booked if actual forfeitures differ from those estimated. The term “forfeitures” is distinct from “cancellations” or “expirations” and represents only the unvested portion of the surrendered stock option or warrant. The Company estimates forfeiture rates for all unvested awards when calculating the expense for the period. In estimating the forfeiture rate, the Company monitors both stock option and warrant exercises as well as employee and non-employee termination patterns.

The resulting stock-based compensation expense for both employee and non-employee awards is generally recognized on a straight-line basis over the requisite service period of the award.

[8] Fair Value Measurements

ASC 820 "Fair Value Measurements" defines fair value, establishes a framework for measuring fair value in GAAP and expands disclosures about fair value measurements. ASC 820 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. ASC 820 establishes a fair value hierarchy that distinguishes between (1) market participant assumptions developed based on market data obtained from independent sources (observable inputs) and (2) an entity's own assumptions about market participant assumptions developed based on the best information available in the circumstances (unobservable inputs). The fair value hierarchy consists of three broad levels, which gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1) and the lowest priority to unobservable inputs (Level 3). The three levels of the fair value hierarchy under ASC 820 are described below:

- Level 1 - Quoted prices (unadjusted) in active markets that are accessible at the measurement date for assets or liabilities. The fair value hierarchy gives the highest priority to Level 1 inputs.
- Level 2 - Directly or indirectly observable inputs as of the reporting date through correlation with market data, including quoted prices for similar assets and liabilities in active markets and quoted prices in markets that are not active. Level 2 also includes assets and liabilities that are valued using models or other pricing methodologies that do not require significant judgment since the input assumptions used in the models, such as interest rates and volatility factors, are corroborated by readily observable data from actively quoted markets for substantially the full term of the financial instrument.
- Level 3 - Unobservable inputs that are supported by little or no market activity and reflect the use of significant management judgment. These values are generally determined using pricing models for which the assumptions utilize management's estimates of market participant assumptions.

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

The carrying amounts of cash and cash equivalents, restricted cash, accounts payable, note payable, lease liability and accrued expenses approximate fair value due to the short-term nature of these instruments.

[9] Earnings Per Share

Basic earnings per common share is computed as net loss divided by the weighted average number of common shares outstanding during the period. Diluted earnings per common share is the same as basic earnings per common share because the Company incurred a net loss during each period presented, and the potentially dilutive securities from the assumed exercise of all outstanding preferred stock, stock options and warrants would have an antidilutive effect. The following schedule details the number of shares issuable upon the exercise of stock options and warrants and conversion of preferred shares to common shares which have been excluded from the diluted loss per share calculation for the years ended December 31, 2016 and 2015:

	<u>2016</u>	<u>2015</u>
Preferred Shares if converted	16,000	-
Stock Options	8,291	6,093
Warrants	<u>40,255</u>	<u>39,250</u>
Total	<u>64,546</u>	<u>45,343</u>

[10] Revenue Recognition

The Company recognizes revenue from the NIH contracts when the specified performance milestone is achieved. The milestones are analyzed and approved on a monthly basis through progress reports submitted by the Company. The existing NIH contracts expired in 2015.

[11] Research and Development

Research and development costs are charged to operations as they are incurred. Legal fees and other direct costs incurred in obtaining and protecting patents are also expensed as incurred, due to the uncertainty with respect to future cash flows resulting from the patents and our included as part of general and administrative expenses in our consolidated statements of operations.

[12] Recent Accounting Pronouncements

In January 2017, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (“ASU”) 2017-04 “*Intangibles – Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment*” The Board is issuing the amendments in this update to simplify the subsequent measurement of goodwill by eliminating Step 2 from the goodwill impairment test. Instead an entity should perform its goodwill impairment test by comparing the fair value of a reporting unit with its carrying amount. An entity should recognize an impairment charge for the amount by which the carrying amount exceeds the reporting unit’s fair value; however, the loss recognized should not exceed the total amount of goodwill allocated to that reporting unit. We are required to apply the amendments in this for its annual or any interim goodwill impairment tests in fiscal years beginning after December 15, 2019. We have evaluated this standard and believes it will not have a material impact on our consolidated financial position or results of operation.

In January 2017, the FASB issued ASU 2017-01 “*Business Combinations (Topic 805)*” The Board is issuing the amendments in this update to clarify the definition of a business with the objective of adding guidance to assist entities with evaluating whether transactions should be accounted for as acquisitions (or disposals) of assets or businesses. The definition of a business affects many areas of accounting including acquisitions, disposals, goodwill, and consolidation. We are required to apply the amendments in this update to annual periods beginning after December 15, 2017, including interim periods within those periods.

In August 2016, the (FASB) issued 2016-15, *Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments* (“ASU 2016-15”), which amended the existing accounting standards for the statement of cash flows. The amendments provide guidance on eight classification issues related to the statement of cash flows. The Company is required to adopt the guidance in the first quarter of 2018 and early adoption is permitted. The amendments should be applied retrospectively to all periods presented. For issues that are impracticable to apply retrospectively, the amendments may be applied prospectively as of the earliest date practicable. The Company but does not believe the adoption will have a material impact on the Company's consolidated statements of cash flows.

In March 2016, the FASB issued ASU 2016-09 “*Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting.*” This ASU simplifies several aspects of the accounting for share-based payment award transactions. The ASU is effective for interim and annual periods beginning after December 15, 2016. Early application is permitted. We have evaluated this standard and believe it will not have a material impact on our consolidated financial position or results of operation.

In February 2016, the FASB issued ASU No. 2016-02, “*Leases*”. The new standard will require most leases to be recognized on the balance sheet which will increase reported assets and liabilities. Lessor accounting remains substantially similar to current guidance. The new standard is effective for annual and interim periods in fiscal years beginning after December 15, 2018, which for us is the first quarter of 2019 and mandates a modified retrospective transition method. We believe that its adoption will not have a material impact on our consolidated financial statements.

In November 2015, the FASB issued ASU 2015-17 “*Simplifying the Classification of Deferred Tax Assets and Liabilities.*” The new standard requires that all deferred tax assets and liabilities, along with any related valuation allowance, be classified as noncurrent on the balance sheet. The standard is effective for interim and annual periods beginning after December 15, 2016 and allows for early adoption using a full retrospective method or a prospective method. We have elected to early adopt the provisions of this new standard using a prospective method. As a result, all deferred taxes as of December 31, 2016 and December 31, 2015 are classified as noncurrent in our consolidated balance sheet, while prior periods remain as previously reported. As of December 31, 2016 there are no deferred tax assets, as we have posted a full allowance against deferred tax assets.

In September 2015, the FASB issued ASU 2015-16 “*Simplifying the Accounting for Measurement-Period Adjustments*.” The new standard eliminates the requirement to restate prior period financial statements for measurement period adjustments. The new standard requires that the cumulative impact of a measurement period adjustment (including the impact on prior periods) be recognized in the reporting period in which the adjustment is identified. The standard was effective for interim and annual periods beginning after December 15, 2015 and its adoption did not have a material impact on our financial condition or results of operations.

In August 2014, the FASB issued ASU 2014-15, “*Disclosure of Uncertainties about an Entity’s Ability to Continue as a Going Concern*.” This ASU describes how an entity should assess its ability to meet obligations and sets rules for how this information should be disclosed in the financial statements. The standard provides accounting guidance that will be used along with existing auditing standards. The ASU is effective for the annual period ending after December 15, 2016 and for annual periods and interim periods after that. Early application is permitted. We have adopted this standard and it does not have a material impact on our consolidated financial position or results of operation.

In May 2014, the FASB issued ASU No. 2014-09, *Revenue from Contracts with Customers* (“ASU 2014-09”). ASU 2014-09 represents a comprehensive new revenue recognition model that requires a company to recognize revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the Partnership expects to be entitled to receive in exchange for those goods or services. This ASU sets forth a new five-step revenue recognition model which replaces the prior revenue recognition guidance in its entirety and is intended to eliminate numerous industry-specific pieces of revenue recognition guidance that have historically existed. In August 2015, the FASB issued ASU No. 2015-14, “*Revenue from Contracts with Customers (Topic 606): Deferral of the Effective Date*”, which defers the effective date of ASU 2014-09 by one year, but permits companies to adopt one year earlier if they choose (i.e., the original effective date). As such, this ASU is effective for annual reporting periods beginning after December 15, 2017 for public companies and 2018 for private companies. Companies may use either a full retrospective or a modified retrospective approach to adopt this ASU. We will adopt this standard once we begin to generate revenue from operations. Successful adoption of ASU 2014-09 is contingent upon the commencement of the marketing of our products.

In March and April 2016, the FASB issued ASU No. 2016-08 “*Revenue from Contracts with Customers (Topic 606): Principal versus Agent Consideration (Reporting Revenue Gross versus Net)*” and ASU No. 2016-10 “*Revenue from Contracts with Customers (Topic 606): Identifying Performance Obligations and Licensing*”, respectively, which clarifies the guidance on reporting revenue as a principal versus agent, identifying performance obligations and accounting for intellectual property licenses. In addition, in May 2016, the FASB issued ASU No. 2016-12 “*Revenue from Contracts with Customers (Topic 606): Narrow-Scope Improvements and Practical Expedients*”, which amends certain narrow aspects of Topic 606. We will adopt this standard once we begin to generate revenue from operations. We do not believe these standards will have a material impact on our consolidated financial position or results of operation.

[13] Business Combination

The Company accounts for acquisitions using the acquisition method of accounting which requires the recognition of tangible and identifiable intangible assets acquired and liabilities assumed at their estimated fair values as of the business combination date. The Company allocates any excess purchase price over the estimated fair value assigned to the net tangible and identifiable intangible assets acquired and liabilities assumed to goodwill. Transaction costs are expensed as incurred in general and administrative expenses. Results of operations and cash flows of acquired companies are included in the Company's operating results from the date of acquisition.

The Company's intangible assets are comprised of acquired in-process research and development, or IPR&D. The fair value of IPR&D acquired through a business combination is capitalized as an indefinite-lived intangible asset until the completion or abandonment of the related research and development activities. IPR&D is tested for impairment annually or when events or circumstances indicate that the fair value may be below the carrying value of the asset. We perform our IPR&D Impairment testing in the fourth quarter. As of December 31, 2016 no impairment of IPR&D has been identified. If and when research and development is complete, the associated assets would then be amortized over their estimated useful lives.

[14] Goodwill and other intangible assets

Goodwill is assessed for impairment at least annually on a reporting unit basis, or more frequently when events and circumstances occur indicating that the recorded goodwill may be impaired. In accordance with the authoritative accounting guidance we have the option to perform a qualitative assessment to determine whether it is more-likely-than-not that the fair value of a reporting unit is less than its carrying amount. If we determine this is the case, we are required to perform the two-step goodwill impairment test to identify potential goodwill impairment and measure the amount of goodwill impairment loss to be recognized, if any. If we determine that it is more-likely-than-not that the fair value of the reporting unit is greater than its carrying amounts, the two-step goodwill impairment test is not required.

As defined in the authoritative guidance, a reporting unit is an operating segment, or one level below an operating segment. Historically, we conducted our business in a single operating segment and reporting unit. In 2016, we assessed goodwill impairment by obtaining a third party appraisal on the reporting unit. In addition, management assesses potential impairment of goodwill on an annual basis at December 31, or whenever events or changes in circumstances indicate that the carrying value may not be recoverable. Based on the results of the appraisal and management's assessment of qualitative factors, it was determined it is more likely than not that the reporting unit's assigned goodwill had estimated fair values greater than the respective reporting unit's individual net asset carrying value. As such, there was no impairment of goodwill in 2016 and the two step impairment test was not performed.

We review other intangible assets for impairment whenever events or changes in business circumstances indicate that the carrying amount of the assets may not be fully recoverable or that the useful lives of these assets are no longer appropriate. The authoritative accounting guidance allows a qualitative approach for testing indefinite-lived intangible assets for impairment, similar to the impairment testing guidance for goodwill. It allows the option to first assess qualitative factors (events and circumstances) that could have affected the significant inputs used in determining the fair value of the indefinite-lived intangible asset. The qualitative factors assist in determining whether it is more-likely-than-not (i.e. > 50% chance) that the indefinite-lived intangible asset is impaired. An organization may choose to bypass the qualitative assessment for any indefinite-lived intangible asset in any period and proceed directly to calculating its fair value. Our indefinite-lived intangible assets are IPR&D intangible assets. Management's assessment of all factors concluded there was no impairment of IPR&D in 2016.

[15] Beneficial Conversion Feature of Convertible Preferred Stock

The Company accounts for the beneficial conversion feature on its convertible preferred stock in accordance with ASC 470-20, *Debt with Conversion and Other Options*. The Beneficial Conversion Feature ("BCF") of convertible preferred stock is normally characterized as the convertible portion or feature that provides a rate of conversion that is below market value or in-the-money when issued. We record a BCF related to the issuance of convertible preferred stock when issued. Beneficial conversion features that are contingent upon the occurrence of a future event are recorded when the contingency is resolved.

To determine the effective conversion price, we first allocate the proceeds received to the convertible preferred stock and then use those allocated proceeds to determine the effective conversion price. If the convertible instrument is issued in a basket transaction (i.e., issued along with other freestanding financial instruments), the proceeds should first be allocated to the various instruments in the basket. Any amounts paid to the investor when the transaction is consummated (e.g., origination fees, due diligence costs) represent a reduction in the proceeds received by the issuer. The intrinsic value of the conversion option should be measured using the effective conversion price for the convertible preferred stock on the proceeds allocated to that instrument. The effective conversion price represents proceeds allocable to the convertible preferred stock divided by the number of shares into which it is convertible. The effective conversion price is then compared to the per share fair value of the underlying shares on the commitment date.

The accounting for a BCF requires that the BCF be recognized by allocating the intrinsic value of the conversion option to additional paid-in capital, resulting in a discount on the convertible preferred stock. This discount should be accreted from the date on which the BCF is first recognized through the earliest conversion date for instruments that do not have a stated redemption date. The intrinsic value of the BCF is recognized as a deemed dividend on convertible preferred stock over a period specified in the guidance.

NOTE D – Acquisition of Aquarius Biotechnologies, Inc. (now Matinas Biopharma Nanotechnologies, Inc.)

On January 29, 2015, we entered into the Merger Agreement with Aquarius, Saffron Merger Sub, Inc., a Delaware corporation and a wholly-owned subsidiary of ours (“Merger Sub”) and J. Carl Craft, as the stockholder representative. The merger contemplated by the Aquarius Merger became effective on January 29, 2015, following the satisfaction or waiver of the conditions described in the Merger Agreement, including approval of the transaction by 100% of Aquarius’ stockholders. Pursuant to the Aquarius Merger, the Merger Sub merged with and into Aquarius, with Aquarius surviving the merger as a wholly-owned subsidiary of ours.

Pursuant to the terms of the Merger Agreement, we were obligated to issue an aggregate of up to 5,000,000 shares of our common stock at closing, subject to adjustment as set forth in the Merger Agreement. At closing, we issued 4,608,020 shares (the “Closing Shares”) of our common stock as closing consideration. In addition, subject to our right of offset for indemnification claims, we may issue up to an additional 3,000,000 shares (the “Additional Shares”) of our common stock upon the achievement of certain milestones. The milestone consideration consists of (i) 1,500,000 shares issuable upon the dosing of the first patient in a phase III trial sponsored by us for a product utilizing Aquarius’ proprietary cochleate delivery technology and (ii) 1,500,000 shares issuable upon FDA approval of the first NDA submitted by us for a product utilizing Aquarius’ proprietary cochleate delivery technology. The Company concluded that the contingent share issuance represented equity settled contingent consideration and have recorded the amounts to equity since inception. None of these milestones have yet been reached, and accordingly, as of December 31, 2016 no additional shares have been issued.

The transaction was accounted for as a business combination, and accordingly the Company has included the results of operations of Aquarius subsequent to the January 29, 2015 closing date. The transaction resulted in a significant amount of in-process research and development, goodwill and deferred tax liability on the balance sheet. There were no changes to the recorded amounts in 2016.

The acquisition-date fair value of the consideration transferred totaled \$2,873,035 as of January 29, 2015 and consisted of the following items:

Fair value of 4,608,020 of common stock issued at a price per share of \$0.46 as of January 29, 2015 the closing date of the merger.	\$ 2,120
Fair value of potential Matinas common stock as contingent consideration that will be issued upon achieving certain future clinical milestone-(a)	422
Fair value of potential Matinas common stock as contingent consideration that will be issued upon achieving certain future regulatory milestone-(a)	331
Total consideration	\$ 2,873

(a)-Reflects recognition of the estimated fair value of the contingent consideration payable with issuance of Matinas common stock upon achievement of certain future clinical and regulatory milestones, the achievement of which is uncertain. The fair value of the additional shares were established by assigning probabilities and projected dates of positive outcome for the milestones and valuing the future issuance of the shares by using the Black-Scholes options pricing model to account for the uncertainty in the future value of the shares. The value of the shares as derived using the options pricing model were then weighted based on the probability of achieving the milestones to determine the fair market value of the additional shares. The entire \$753,346 of contingent consideration was recorded as additional paid-in capital during the year ended December 31, 2015.

Deferred income taxes arising from basis differences of tax aspects of in-process research and development from the transaction amounted to \$1.2 million as indicated on the consolidated balance sheets for the years ended December 31, 2016 and 2015.

NOTE E – 2016 Private Placement Funding

In July, August and September 2016, we conducted closings for a private placement, or the “2016 Private Placement,” pursuant to which we sold to accredited investors an aggregate of 1,600,000 Series A Preferred Shares, which are convertible into 16,000,000 shares of common stock based on the current conversion price, at a purchase price of \$5.00 per share, for aggregate gross proceeds to the Company of \$8.0 million (see note G for additional information about Preferred Stock). Net proceeds were approximately \$6.8 million after legal and placement agent fees listed below.

We entered into a Placement Agency Agreement with Aegis Capital Corp. pursuant to which Aegis acted as our exclusive placement agent for the 2016 Private Placement. Immediately prior to the 2016 Private Placement, the Placement Agent and its affiliates beneficially owned an aggregate of more than 10% of our outstanding equity securities. In addition, Adam Stern, Head of Private Equity Banking at Aegis, is a member of our board of directors. Pursuant to the terms of the Placement Agency Agreement, in connection with the 2016 Private Placement, we paid the Placement Agent an aggregate cash fee of \$800,000 and a non-accountable expense allowance of \$240,000 and have issued to the Placement Agent warrants to purchase 1,600,000 shares of common stock at \$0.50 per share. These warrants are equity classified and accounted for as preferred stock issuance cost within equity. The warrants provide for a cashless exercise feature and are exercisable for a period of five years from the date of closing. We have also agreed to pay the Placement Agent similar cash and warrant compensation with respect to, and based on, any individual or entity that the Placement Agent solicits interest from in connection with this Offering, excluding existing stockholders of the Company and certain other specified investors, who subsequently invests in us at any time prior to the date that is twelve (12) months following the final Closing of this Offering. In addition, we entered into a three year, non-exclusive finder’s fee agreement with the Placement Agent providing that if the Placement Agent shall introduce us to a third party that consummates certain types of transactions with our Company, such as business combinations, joint ventures and licensing arrangements, then the Placement Agent will be paid a finder’s fee, payable in cash at the closing of such transaction, equal to (a) 5% of the first \$1,000,000 of the consideration paid in such transaction; plus (b) 4% of the next \$1,000,000 of the consideration paid in such transaction; plus (c) 3% of the next \$5,000,000 of the consideration paid in the such transaction; plus (d) 2.5% of any consideration paid in such transaction in excess of \$7,000,000.

NOTE F – Equipment

Fixed assets, summarized by major category, consist of the following for the year ended:

	December 31, 2016	December 31, 2015
Lab Equipment	\$ 438	327
Furniture and Fixtures	20	20
Capitalized Leased Equipment	31	111
Leasehold Improvements	7	7
Total	496	465
Less accumulated depreciation and amortization	140	87
Equipment, net	\$ 356	\$ 378

In 2016, the company entered a 36-month capital lease for lab equipment which has a buyout option of \$1 at the end of lease. The lab equipment under this lease was capitalized and will be depreciated on a straight-line basis over the lease term of 36 months. During the years ended December 31, 2016 and 2015, the Company recognized interest expense of \$1,198 and \$885, respectively associated with the capital lease payments. Depreciation expense for the years ended December 31, 2016 and 2015 was approximately \$53 thousand and \$44 thousand, respectively.

NOTE G - Stock Holders Equity

Preferred Stock

In accordance with the Certificate of Incorporation, there are 10,000,000 authorized preferred shares at a par value of \$ 0.001. In connection with the 2016 Private Placement, on July 26, 2016, the Company filed a Certificate of Designation (the "Certificate of Designations") with the Secretary of State of the State of Delaware to designate the preferences, rights and limitations of the Series A Preferred Shares. Pursuant to the Certificate of Designations, the Company designated 1,600,000 shares of the Company's previously undesignated preferred stock as Series A Preferred Stock.

Conversion:

Each Series A Preferred Share is convertible at the option of the holder into such number of shares of the Company's common stock equal to the number of Series A Preferred Shares to be converted, multiplied by the stated value of \$5.00 (the "Stated Value"), divided by the Conversion Price in effect at the time of the conversion (the initial conversion price will be \$0.50, subject to adjustment in the event of stock splits, stock dividends, and fundamental transactions). Based on the current conversion price, the Series A Preferred Stock is convertible into 16,000,000 shares of common stock. A fundamental transaction means: (i) our merger or consolidation with or into another entity, (ii) any sale of all or substantially all of our assets in one transaction or a series of related transactions, or (iii) any reclassification of our Common Stock or any compulsory share exchange by which Common Stock is effectively converted into or exchanged for other securities, cash or property. Each Series A Preferred Share will automatically convert into common stock upon the earlier of (i) notice by the Company to the holders that the Company has elected to convert all outstanding Series A Preferred Shares; provided however that in the event the Company elects to force automatic conversion pursuant to this clause (i), the conversion date for purposes of calculating the accrued Dividend (as defined below) is deemed to be the July 29, 2019, which is third anniversary of the Initial Closing, (ii) three years from the Initial Closing, (iii) the approval of the Company's MAT2203 product candidate by the U.S. Food and Drug Administration or the European Medicines Agency (the "Regulatory Approval") or (iv) the Regulatory Approval of the Company's MAT2501 product candidate.

Beneficial Conversion Feature- Series A Preferred Stock (deemed dividend):

Each share of Series A Preferred Stock is convertible into shares of common stock, at any time at the option of the holder at a conversion price of \$0.50 per share. On July 29, 2016, August 16, 2016, and September 12, 2016, the date of issuances of the Series A, the publicly traded common stock prices were \$0.67, \$0.70, and \$1.00 per share, respectively.

Based on the guidance in ASC 470-20-20, the Company determined that a beneficial conversion feature exists, as the effective conversion price for the Series A preferred shares at issuance was less than the fair value of the common stock into which the preferred shares are convertible. A beneficial conversion feature based on the intrinsic value of the date of issuances for the Series A was approximately \$4.4 million. The beneficial conversion amount of approximately \$4.4 million was then accreted back to the preferred stock as a deemed dividend and charged to accumulated deficit as the conversion rights were 100% effective at the time of issuance.

Liquidity Value and Dividends:

Pursuant to the Certificate of Designations, the Series A Preferred Shares accrue dividends at a rate of 8.0% per year, payable to the holders of such Series A Preferred Shares in shares of common stock upon conversion. Dividends which have been earned but not declared through December 31, 2016 are approximately \$187 thousand. The Series A Preferred Shares vote on an as converted basis with the Company's common stock. Upon any dissolution, liquidation or winding up, whether voluntary or involuntary, holders of Series A Preferred Shares are entitled to (i) first receive distributions out of our assets in an amount per share equal to the Stated Value plus all accrued and unpaid dividends, whether capital or surplus before any distributions shall be made on any shares of common stock and (ii) second, on an as-converted basis alongside the common stock.

Royalty:

The Series A Preferred Shares include the right, as a group, to receive: (i) 4.5% of the net sales of MAT2203 and MAT2501, in each case from and after the date, respectively, such candidate has received FDA or EMA approval, and (ii) 7.5% of the proceeds, if any, received by the Company in connection with the licensing or other disposition by the Company of MAT2203 and/or MAT2501 (“Royalty Payment Rights”). The royalty is payable so long as the Company has valid patents covering MAT2203 and MAT2501, as applicable. The Royalty Payment Rights are unsecured obligations of the Company. The royalty payment will be allocated to the holders based on their pro rata ownership of vested Series A Preferred Shares. The royalty rights that are part of the Series A Preferred Shares will vest, in equal thirds, upon each of the July 29, 2017, July 29, 2018, and July 29, 2019, which are the first, second and third anniversary dates of the Initial Closing, (each a “Vesting Date”); provided however, if the Series A Preferred Shares automatically convert into common stock prior to the 36 month anniversary of the initial closing, then the royalty rights that are part of the outstanding Series A Preferred Shares shall be deemed to be fully vested as of the date of conversion. Even if the Series A Preferred Shares are purchased after the initial closing, the vesting periods for the royalty rights that are part of the Series A Preferred Shares shall still be based on the Vesting Dates. During the first 36 months following the initial closing, the right to receive a royalty will follow the Series A Preferred Shares; after July 29, 2019 the royalty payment rights may be transferred separately from the Series A Preferred Stock subject to available exemption from registration under applicable securities laws. The Company believes that such rights are not separable free standing instruments requiring bifurcation at the date of transaction. The Company may recognize a deemed dividend for the estimated fair value of the vested portion of the royalty rights in future periods. As of December 31, 2016, no accrual has been recorded for royalty payments as it is not probable at this time that any amount will be paid.

Classification:

These Series A Preferred Shares are classified within permanent equity on the Company’s consolidated balance sheet as they do not meet the criteria that would require presentation outside of permanent equity under ASC 480 *Distinguishing Liabilities from Equity*.

Warrants

As of December 31, 2016, the Company had outstanding warrants to purchase an aggregate of 40,255,234 shares of common stock at exercise prices ranging from \$0.50 to \$2.00 per share.

The Warrants are exercisable immediately upon issuance and have a five-year term. The Warrants may be exercised at any time in whole or in part upon payment of the applicable exercise price until expiration of the Warrants. No fractional shares will be issued upon the exercise of the Warrants. The exercise price and the number of warrant shares purchasable upon the exercise of the Investor Warrants (as opposed to Placement Agent Warrants) are subject to adjustment upon the occurrence of certain events, which include stock dividends, stock splits, combinations and reclassifications of the Company capital stock or similar “organic changes” to the equity structure of the Company (see Warrant table below). Accordingly, pursuant to ASC 815, the warrants are classified as equity.

The Company may call the Warrants, other than the Placement Agent Warrants, at any time the common stock trades above \$5.00 (for 13 million warrants issued in 2013) or above \$ 3.00 (for 20 million warrants issued in 2015) for twenty (20) consecutive days following the effectiveness of the registration statement covering the resale of the shares of common stock underlying the Warrants, provided that the Warrants can only be called if such registration statement is current and remains effective at the time of the call and provided further that the Company can only call the Investor Warrants for redemption, if it also calls all other Warrants for redemption on the terms described above. The Placement Agent Warrants do not have a redemption feature. The Placement Agent Warrants may be exercised on a “cashless” basis. Such term is a contingent feature and within the control of the Company, therefore does not require liability classification

A summary of equity warrants outstanding as of December 31, 2016 is presented below, all of which are fully vested.

	Shares
Total Warrants Issued through December 31, 2014	15,250
Investor Warrants, issued, terms 5 years, exercisable at \$0.75	20,000
Placement Agent Warrants, issued, terms 5 years, exercisable at \$0.75	2,000
Placement Agent Warrants, issued, terms 5 years, exercisable at \$0.50	2,000
Total Warrants Issued through December 31, 2015	<u>39,250</u>
2016 Warrant activity:	
September 12, 2016, Placement Agent Warrants, 1,600,000 issued, terms 5 years, exercisable at \$0.50	1,600
Third quarter, 2016, exercised Warrants	(333)
Fourth quarter, 2016, exercised Warrants	(262)
Total Warrants Outstanding at December 31, 2016	<u><u>40,255</u></u>

As described in Note J Subsequent Events, on December 14, 2016 the Company offered to amend and exercise, all Original Warrants with exercise prices of \$0.75 or above, for a reduced exercise price of \$0.50. This offer to amend and exercise was closed on January 13, 2017 and resulted in the exercise of approximately 31 million warrants.

NOTE H - Stock Based Compensation

In August 2013, the Company adopted the 2013 Equity Compensation Plan (the "Plan"), which provides for the granting of incentive stock options, nonqualified stock options, restricted stock units, performance units, and stock purchase rights. Options under the Plan may be granted at prices not less than 100% of the fair value of the shares on the date of grant as determined by the Board Committee. The Board Committee determines the period over which the options become exercisable subject to certain restrictions as defined in the Plan, with the current outstanding options generally vesting over three years. The term of the options is no longer than ten years. The Company currently has 11,828,912 shares of common stock for issuance under the plan.

With the approval of the Board of Directors and majority Shareholders, effective May 8, 2014, the Plan was amended and restated. The amendment provides for an automatic increase in the number of shares of common stock available for issuance under the Plan each January (with Board approval), commencing January 1, 2015 in an amount up to four percent (4%) of the total number of shares of common stock outstanding on the preceding December 31st.

The Company recognized stock-based compensation expense (options, and restricted share grants) in its consolidated statements of operations as follows:

	Year Ended December 31,	
	2016	2015
Research and Development	\$ 554	\$ 528
General and Administrative	965	1,064
Total	<u><u>\$ 1,519</u></u>	<u><u>\$ 1,592</u></u>

The following table contains information about the Company's stock plan at December 31, 2016:

	Awards Reserved for Issuance	Awards Issued	Awards Available for Grant
2013 Equity Compensation Plan	11,829	9,325*	2,504

* includes both stock grants and option grants

The following table summarizes the Company's stock option activity and related information for the period from January 1, 2015 to December 31, 2016:

	Number of Options	Weighted Average Exercise Price	Weighted Average Contractual Term In Years
Outstanding at January 1, 2015	5,353	\$ 1.06	9.1
Granted	1,960	0.56	
Exercised	-		
Forfeited	(217)	0.95	
Expired	(193)	0.89	
Outstanding at December 31, 2015	6,903	\$ 0.93	8.4
Granted	1,631	0.41	
Exercised	-		
Forfeited	(180)	0.66	
Cancelled	(64)	0.94	
Expired	-		
Outstanding at December 31, 2016	8,290	\$ 0.85	7.3

As of December 31, 2016, the number of vested shares underlying outstanding options was 6,445,860 at a weighted average exercise price of \$0.94. The aggregate intrinsic value of in-the-money options outstanding as of December 31, 2016 was \$4.6 million. The aggregate intrinsic value is calculated as the difference between the Company's closing stock price of \$1.40 on December 31, 2016, and the exercise price of options, multiplied by the number of options. As of December 31, 2016, there was approximately \$700 thousand of total unrecognized share-based compensation. Such costs are expected to be recognized over a weighted average period of approximately 0.6 years.

All options expire ten years from date of grant. Except for options granted to consultants, all remaining options vest entirely and evenly over three years. A portion of options granted to consultants vests over four years, with the remaining vesting being based upon the achievement of certain performance milestones, which are tied to either financing or drug development initiatives.

The Company recognizes compensation expense for stock option awards on a straight-line basis over the applicable service period of the award. The service period is generally the vesting period, with the exception of options granted subject to a consulting agreement, whereby the option vesting period and the service period defined pursuant to the terms of the consulting agreement may be different. Stock options issued to consultants are revalued quarterly until fully vested, with any change in fair value expensed. The following weighted-average assumptions were used to calculate share based compensation:

	For the Year Ended December 31,	
	2016	2015
Volatility	44.72 % - 89.15%	71.1% - 102.3 %
Risk-free interest rate	1.14 % - 2.09%	1.34% - 1.74 %
Dividend yield	0.0%	0.0%
Expected life	6.0 years	6.0 years

The Company does not have sufficient historical information to develop reasonable expectations about future exercise patterns and post-vesting employment termination behavior. Hence, the Company uses the "simplified method" described in Staff Accounting Bulletin (SAB) 107 to estimate expected term of share option grants.

The expected stock price volatility assumption was determined by examining the historical volatilities for industry peers, as the Company has limited history for the Company's common stock. The Company will continue to analyze the historical stock price volatility and expected term assumptions as more historical data for the Company's common stock becomes available.

NOTE I – COMMITMENTS

On November 1, 2013, the Company entered into a 7-year lease for office space in Bedminster, New Jersey which commenced in June, 2014 at a monthly rent of \$12,723, increasing to approximately \$14,200 per month toward the end of the term.

On December 15, 2016, the Company entered into a 10 year, 3-month lease to consolidate our locations while expanding our laboratory and manufacturing facilities. We estimate that the lease will begin on April 1, 2017, upon completion of construction. The monthly rent will start at approximately \$ 43 thousand, increasing to approximately \$ 64 thousand in the final year.

The Company records rent expense on a straight-line basis. Rent expense for the years ended December 31, 2016 and 2015 was \$ 243,790 and \$211,500, respectively.

Listed below is a summary of future minimum rental payments:

Year Ending December 31,	Lease Commitments
2017	\$ 418
2018	700
2019	725
2020	751
2021	691
Total future minimum lease payments	<u>\$ 3,285</u>

The Company was obligated to provide a security deposit of \$300,000 to obtain the office lease space. This deposit was reduced by \$100,000 in 2016 and 2015 and can be reduced down to \$50,000 in 2017, as long as the Company makes timely rental payments.

To obtain the laboratory and facility site, the Company was obligated to provide a security deposit of \$586,000. This security deposit can be reduced \$100,000 on each of the first three anniversaries of the rent commencement date. On the fourth anniversary, it can be reduced another \$86,000, with the balance over the remaining life of the lease.

On February 18, 2016 the Company entered into a Cooperative Research and Development Agreement (CRADA) with the National Institute of Allergy and Infectious Diseases to support NIH investigators in the conduct of clinical research to investigate the safety, efficacy, and pharmacokinetics of encochleated drug products in patients with fungal, bacterial, or viral infections at an annual funding of \$200,000 per year for 3 years.

In July 2016, the Company entered into a Finance Agreement in the amount of \$262,324, to fund the premium payments for the Director and Officer Liability policy. The term of this agreement is 10 months, ending May 30, 2017. Monthly payments including interest at 3.25% are \$23,962.

On November 10, 2016 the Company entered into a Cooperative Research and Development Agreement (CRADA) with the National Institute of Allergy and Infectious Diseases to support NIH investigators to acquire technical, statistical and administrative support for research activities as well as to pay for supplies and travel expenses for a total amount of \$132,568 paid in 4 equal quarterly installments beginning in the fourth quarter 2016 and each quarter during 2017.

Through our acquisition of Aquarius, we acquired a license from Rutgers University, The State University of New Jersey (successor in interest to the University of Medicine and Dentistry of New Jersey) for the cochleate delivery technology. The Amended and Restated Exclusive License Agreement between Aquarius and Rutgers provides for, among other things, (1) royalties on a tiered basis between low single digits and the mid-single digits of net sales of products using such licensed technology, (2) a one-time sales milestone fee of \$100,000 when and if sales of products using the licensed technology reach the specified sales threshold and (3) an annual license fee of initially \$10,000, increasing to \$50,000 over the term of the license agreement.

On September 12, 2016 the Company conducted a final closing of a private placement offering to accredited investors shares of the Company's Series A Preferred Stock. As part of this offer, the investors received royalty payment rights if and when the Company generates sales of MAT2203 or MAT250. Pursuant to the terms of the Certificate of Designations of Preferences, Rights and Limitations (the "Certificate of Designations") for our outstanding Series A Preferred Stock, we may be required to pay royalties of up to \$35 million per year. If and when we obtain FDA or EMA approval of MAT2203 and/or MAT2501, which we do not expect to occur before 2020, if ever, and/or if we generate sales of such products, or we receive any proceeds from the licensing or other disposition of MAT2203 or MAT2501, we are required to pay to the holders of our Series A Preferred Stock, subject to certain vesting requirements, in aggregate, a royalty equal to (i) 4.5% of Net Sales (as defined in the Certificate of Designations), subject in all cases to a cap of \$25 million per calendar year, and (ii) 7.5% of Licensing Proceeds (as defined in the Certificate of Designations), subject in all cases to a cap of \$10 million per calendar year. The Royalty Payment Rights will expire when the patents covering the applicable product expire, which is currently expected to be in 2033.

The Company also has employment agreements with certain employees which require the funding of a specific level of payments, if certain events, such as a change in control, termination without cause or retirement, occur.

NOTE J – Income Taxes

The Company utilizes the liability method of accounting for deferred income taxes. Under this method, deferred tax liabilities and assets are recognized for the expected future tax consequences of temporary differences between the carrying amounts and the tax basis of assets and liabilities. A valuation allowance is established against deferred tax assets when, based on the weight of available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized. The Company's policy is to record interest and penalties on uncertain tax positions as income tax expense. As of December 31, 2016 and December 31, 2015, the Company does not believe any material uncertain tax positions were present. Accordingly, interest and penalties have not been accrued due to an uncertain tax position.

Deferred income taxes reflect the net effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. A reconciliation of the statutory U.S. federal rate to the Company's effective tax rate is as follows:

	Years ended December 31,	
	2016	2015
Percent of pre-tax income:		
U.S. federal statutory income tax rate	34.0%	34.0%
Permanent items	(3.9)%	(5.3)%
Research and development credit	3.4%	3.0%
Change in valuation allowance	(33.5)%	(31.7)%
Effective income tax rate	<u>0.0%</u>	<u>0.0%</u>

The Company has no current income taxes payable other than certain state minimum taxes which are included in general and

administrative expenses.

Significant components of the Company's deferred tax assets (liabilities) for 2016 and 2015 consist of the following:

	(\$ in thousands)	
	As of December 31,	
	2016	2015
Deferred tax assets (liabilities)		
Share-based compensation	\$ 549	\$ 519
Depreciation and amortization	12	37
Warrants	43	44
Accrued liability	253	118
Net operating loss carryforwards	9,068	7,093
Federal research and development credit carryforwards	804	525
Other	2	-
In process research and development	(1,205)	(1,205)
Deferred income tax assets	9,526	7,131
Valuation allowance	(10,731)	(8,336)
Net deferred tax liabilities	\$ (1,205)	\$ (1,205)

In assessing the realizability of deferred tax assets, the Company considers whether it is more likely than not that some portion or all of the deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependent upon the generation of taxable income during the periods in which the temporary differences representing net future deductible amounts become deductible, and is impacted by the Company's ability to carryback losses to previous years in which the Company had taxable income. Due to the Company's history of losses and lack of other positive evidence to support taxable income, the Company has recorded a valuation allowance against those deferred tax assets that are not expected to be realized. The valuation allowance was approximately \$10.7 million and \$8.3 million as of December 31, 2016 and 2015, respectively, representing an increase of \$2.4 million.

As of December 31, 2016, the Company had Federal net operating loss carryforwards of \$ 25.3 million. The Company also had federal and state research and development tax credit carryforwards of \$851,000. The federal net operating loss and tax credit carryforwards will expire at various dates beginning in 2033, if not utilized. The difference between the statutory tax rate and the effective tax rate is primarily attributable to the valuation allowance offsetting deferred tax assets.

In December 2016, the Company recognized a tax benefit of approximately \$675,000 in connection with the sale of state net operating losses and state research and development credits to a third party under the New Jersey Technology Business Tax Certificate Program. The previous year's tax benefit was approximately \$760,000.

Utilization of the net operating losses and general business tax credits carryforwards may be subject to a substantial limitation under Sections 382 and 383 of the Internal Revenue Code of 1986 due to changes in ownership of the Company that have occurred previously or that could occur in the future. These ownership changes may limit the amount of net operating losses and general business tax credits carryforwards that can be utilized annually to offset future taxable income and tax, respectively. In general, an ownership change, as defined by Section 382, results from transactions increasing the ownership of certain stockholders or public groups in the stock of a corporation by more than 50 percentage points over a three-year period. The Company has not completed a study to determine whether it had undergone an ownership change since the Company's inception.

NOTE K – Subsequent Events

On January 13, 2017, the Company completed its tender offer to amend and exercise certain categories of existing warrants.

Pursuant to the Offer to Amend and Exercise, an aggregate of 30,966,350 Original Warrants were tendered by their holders and were amended and exercised in connection therewith for an aggregate exercise price of approximately \$13.5 million, including the following: 3,750,000 Formation Warrants; 754,000 Merger Warrants; 7,243,750 2013 Investor Warrants; 500,000 Private Placement Warrants; 14,750,831 2015 Investor Warrants; 722,925 \$2.00 PA Warrants (of which 721,987 were exercised on a cashless basis); 1,426,687 \$1.00 PA Warrants (of which 1,424,812 were exercised on a cashless basis); and 1,818,157 \$0.75 PA Warrants (of which 1,774,017 were exercised on a cashless basis). The gross cash proceeds from such exercises were approximately \$13.5 million and the net cash proceeds after deducting warrant solicitation agent fees and other estimated offering expenses were approximately \$12.7 million. Prior to the Offer to Amend and Exercise, the Company had 58,159,495 shares of common stock outstanding and warrants to purchase an aggregate of 40,255,234 shares of common stock. Following the Offer to Amend and Exercise, the Company had 87,310,154 shares of common stock outstanding and warrants to purchase an aggregate of 9,288,884 shares of common stock.

The Company retained Aegis Capital Corp. ("Aegis Capital") to act as its Warrant Agent for the Offer to Amend and Exercise pursuant to a Warrant Agent Agreement. Aegis Capital received a fee equal to 5% of the cash exercise prices paid by holders of the Original Warrants (excluding the placement agent warrants) who participated in the Offer to Amend and Exercise. In addition, the Company agreed to reimburse Aegis Capital for its reasonable out-of-pocket expenses and attorney's fees, including a \$35,000 non-accountable expense allowance.



NUMBER
CERT.9999

MATINAS BIOPHARMA HOLDINGS, INC.

SHARES
9000000

INCORPORATED UNDER THE LAWS OF THE STATE OF DELAWARE CUSIP # 999999ZZ9
\$0.0001 PAR VALUE COMMON STOCK

THIS CERTIFIES THAT * SPECIMEN *

Is The Owner of

* NINE MILLION *

FULLY PAID AND NON-ASSESSABLE SHARES OF COMMON STOCK
MATINAS BIOPHARMA HOLDINGS, INC.

Transferable on the books of the Corporation in person or by duly authorized attorney upon surrender of this Certificate properly endorsed. This Certificate is not valid until countersigned by the Transfer Agent and registered by the Registrar.

Dated: JANUARY 01, 2009

COUNTERSIGNED AND REGISTERED:
VSTOCK TRANSFER, LLC
Transfer Agent and Registrar


President & CEO


Executive Vice President

By _____
AUTHORIZED SIGNATURE



The following abbreviations, when used in the inscription on the face of this certificate, shall be construed as though they were written out in full according to applicable laws or regulations.

TEN COM	- as tenants in common	UNIF GIFT MIN ACT.....Custodian.....
TEN ENT	- as tenants by the entireties	(Cust) (Minor)
JT TEN	- as joint tenants with the right of survivorship and not as tenants in common	Act..... (State)

Additional abbreviations may also be used though not in the above list.

For value received, _____ hereby sell, assign and transfer unto

PLEASE INSERT SOCIAL SECURITY OR OTHER IDENTIFYING NUMBER OF ASSIGNEE:

(PLEASE PRINT OR TYPEWRITE NAME AND ADDRESS, INCLUDING ZIP CODE, OF ASSIGNEE)

_____ shares

of the capital stock represented by the within Certificate, and do hereby irrevocably constitute and appoint

_____, Attorney
to transfer the said stock on the books of the within named Corporation with full power of substitution in the premises.

Dated _____

X _____

THE SIGNATURE TO THIS ASSIGNMENT MUST CORRESPOND WITH THE NAME AS WRITTEN UPON THE FACE OF THIS CERTIFICATE. THE SIGNATURE(S) MUST BE GUARANTEED BY AN ELIGIBLE GUARANTOR INSTITUTION (Banks, Stockbrokers, Savings and Loan Associations and Credit Unions).

SIGNATURE GUARANTEED:

TRANSFER FEE WILL APPLY

Mr. Roelof Rongen March 1, 2017 employment letter**EMPLOYMENT AGREEMENT**

This EMPLOYMENT AGREEMENT (this "Agreement"), effective as of March 1, 2017, (the "Effective Date"), is by and between MATINAS BIOPHARMA HOLDINGS, INC., a Delaware corporation (the "Company") and Roelof Rongen (the "Executive").

WITNESSETH:

WHEREAS, the Company desires to employ continue to employ the Executive as its Chief Executive Officer and the Executive desires to continue such employment, on the terms and conditions set forth in this Agreement; and

WHEREAS, the Company and the Executive have mutually agreed that, as of the Effective Date, this Agreement shall govern the terms of employment between the Executive and the Company.

NOW, THEREFORE, in consideration of the promises and the mutual covenants and agreements contained herein and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto, intending to be legally bound hereby, agree as follows:

ARTICLE 1

EMPLOYMENT; TERM OF AGREEMENT

Section 1.1. Employment and Acceptance. During the Term (as defined in Section 1.2), the Company shall employ the Executive, and the Executive shall accept such employment and serve the Company, in each case, subject to the terms and conditions of this Agreement.

Section 1.2. Term. The employment relationship hereunder shall be for the period commencing on the Effective Date and continue until it is terminated by either the Company or the Executive in accordance with ARTICLE 4 (the "Term"). In the event that the Executive's employment with the Company terminates, the Company's obligation to continue to pay, after the Termination Date (as defined in Section 4.2(b)), Base Salary (as defined in Section 3.1(a)), Annual Bonus (as defined in Section 3.1(b)) and other unaccrued benefits shall terminate, except as may be provided for in ARTICLE 4.

ARTICLE 2

TITLE; DUTIES AND OBLIGATIONS; LOCATION

Section 2.1. Title. The Company shall employ the Executive to render exclusive and full-time services to the Company. The Executive shall serve in the capacity of Chief Executive Officer.

Section 2.2. Duties. The Executive shall report to the Company's Board of Directors (the "Board") and be subject to the lawful direction of the Board. The Executive agrees to perform to the best of his ability, experience and talent those acts and duties, consistent with the position of Chief Executive Officer as the Board shall from time to time direct. During the Term, the Executive also shall serve in such other executive-level positions or capacities as may, from time to time, be reasonably requested by the Board, including, without limitation (subject to election, appointment, re-election or re-appointment, as applicable) as (a) a member of the Board and/or as a member of the board of directors or similar governing body of any of the Company's subsidiaries or other Affiliates (as defined below), (b) an officer of any of the Company's subsidiaries or other Affiliates, and/or (c) a member of any committee of the Company and/or any of its subsidiaries or other Affiliates, in each case, for no additional compensation. As used in this Agreement, "Affiliate" of any individual or entity means any other individual or entity that directly or individual controls, is controlled by, or is under common control with, the individual or entity. For avoidance of doubt, any election of the Executive as a member of the Board is independent from the employment of the Executive under this Agreement and subject to normal procedures, bylaws and agreements regulating the election and/or removal of the members of the Board; provided, however, that, as set forth above, such service shall be for no additional compensation.

Section 2.3. Compliance with Policies, etc. During the Term, the Executive shall be bound by, and comply fully with, all of the Company's policies and procedures for employees and officers in place from time to time, including, but not limited to, all terms and conditions set forth in the Company's employee handbook, compliance manual, codes of conduct and any other memoranda and communications applicable to the Executive pertaining to the policies, procedures, rules and regulations, as currently in effect and as may be amended from time to time. These policies and procedures include, among other things and without limitation, the Executive's obligations to comply with the Company's rules regarding confidential and proprietary information and trade secrets.

Section 2.4. Time Commitment. During the Term, the Executive shall use his best efforts to promote the interests of the Company (including its subsidiaries and other Affiliates) and shall devote all of his business time, ability and attention to the performance of his duties for the Company and shall not, directly or indirectly, render any services to any other person or organization, whether for compensation or otherwise, except with the Board's prior written consent or as specified on Schedule A of the Covenants Agreement (as defined in Section 5.1), provided that the foregoing shall not prevent the Executive from (i) participating in charitable, civic, educational, professional, community or industry affairs, or (ii) managing the Executive's passive personal investments, so long as, in each case, such activities individually or in the aggregate do not materially interfere or conflict with the Executive's duties hereunder or create a potential business or fiduciary conflict (in each case, as determined by the Board).

Section 2.5. Location. The Executive's principal place of business for the performance of his duties under this Agreement shall be at the principal executive office of the Company. Notwithstanding, the foregoing, the Executive shall be required to travel as necessary to perform his duties hereunder.

ARTICLE 3 COMPENSATION AND BENEFITS; EXPENSES

Section 3.1. Compensation and Benefits. For all services rendered by the Executive in any capacity during the Term (including, without limitation, serving as an officer, director or member of any committee of the Company or any of its subsidiaries or other Affiliates), the Executive shall be compensated as follows (subject, in each case, to the provisions of ARTICLE 4 below):

(a) Base Salary. Effective March 1, 2017, the Company shall pay the Executive a base salary (the "Base Salary") at the annualized rate of \$400,000, which shall be subject to customary withholdings and authorized deductions and be payable in equal installments in accordance with the Company's customary payroll practices in place from time to time. The Executive's Base salary shall be subject to periodic adjustments as the Board and/or the Compensation Committee of the Board (the "Compensation Committee") shall in its/their discretion deem appropriate. As used in this Agreement, the term "Base Salary" shall refer to Base Salary as may be adjusted from time to time.

(b) Annual Bonus. For each calendar year ending during the Term (beginning with the calendar year ending December 31, 2017), the Executive shall be eligible to receive an annual bonus (the "Annual Bonus") with a target amount equal to fifty percent (50%) of the Base Salary earned by the Executive for such calendar year (the "Target Annual Bonus"). The actual amount of each Annual Bonus will be based upon the level of achievement of the Company's corporate objectives and the Executive's individual objectives, in each case, as established by the Board or the Compensation Committee for the calendar year with respect to which such Annual Bonus relates. The determination of the level of achievement of the corporate objectives and the Executive's individual performance objectives for a year shall be made by the Board or the Compensation Committee, in its reasonable discretion. Each Annual Bonus for a calendar year, to the extent earned, will be paid in a lump sum in the following calendar year, within the first 75 days of such following year. The Annual Bonus shall not be deemed earned until the date that it is paid. Accordingly, in order for the Executive to receive an Annual Bonus, the Executive must be actively employed by the Company at the time of such payment.

(c) 2016 Bonus. As a result of the Executive's continued employment with the Company and the Executive's performance during the 2016 calendar year, the Company will pay to the Executive in a lump sum the amount of \$160,000 by March 15, 2017.

(d) Equity Compensation. On February 21, 2017, the Compensation Committee approved a grant to the Executive of options to purchase up to 600,000 shares of the Company's common stock pursuant to the Company's 2013 Equity Compensation Plan, as amended and restated (the "2013 Plan"), on the terms and conditions determined by the Compensation Committee. During the Term, subject to the terms and conditions established within the 2013 Plan or any successor equity compensation plan as may be in place from time to time and separate Award Agreements (as defined in the 2013 Plan), the Executive also shall be eligible to receive from time to time additional Stock Options, Stock Unit Awards, Performance Shares, Performance Units, Incentive Bonus Awards, Other Cash-Based Awards and/or Other Stock-Based Awards (as such capitalized terms are defined in the 2013 Plan), in amounts, if any, to be approved by the Board or the Compensation Committee in its discretion.

(e) Benefit Plans. The Executive shall be entitled to participate in all employee benefit plans and programs (excluding severance plans, if any) generally made available by the Company to senior executives of the Company, to the extent permissible under the general terms and provisions of such plans or programs and in accordance with the provisions thereof. The Company may amend, modify or rescind any employee benefit plan or program and/or change employee contribution amounts to benefit costs without notice in its discretion.

(f) Paid Vacation. The Executive shall be entitled to paid vacation days in accordance with the Company's vacation policies in effect from time to time for its executive team; provided, however, that the Executive shall be entitled to no less than fifteen (15) paid vacation days per calendar year during the Term.

Section 3.2. Expense Reimbursement. The Company shall reimburse the Executive during the Term, in accordance with the Company's expense reimbursement policies in place from time to time, for all reasonable out-of-pocket business expenses incurred by the Executive in the performance of his duties hereunder. In order to receive such reimbursement, the Executive shall furnish to the Company documentary evidence of each such expense in the form required to comply with the Company's policies in place from time to time.

ARTICLE 4 TERMINATION OF EMPLOYMENT

Section 4.1. Termination Without Cause or Resignation for Good Reason.

(a) The Company may terminate the Executive's employment hereunder at any time without Cause (other than by reason of death or Disability) upon ninety (90) days prior written notice to the Executive. Executive may terminate his employment hereunder for Good Reason upon written notice to the Company in accordance with the provisions set forth in Section 4.1(c).

(b) As used in this Agreement, "Cause" means: (i) a material act, or act of fraud, committed by the Executive that is intended to result in the Executive's personal enrichment to the detriment or at the expense of the Company or any of its Affiliates; (ii) the Executive is convicted of a felony; (iii) gross negligence or willful misconduct by the Executive, or failure by the Executive to perform the duties or obligations reasonably assigned to the Executive by the Board or the CEO from time to time, which is not cured upon ten (10) days prior written notice (unless such negligence, misconduct or failure is not susceptible to cure, as determined in the reasonable discretion of the Board); or (iv) the Executive violates the Covenants Agreement (as defined in Section 5.1 below).

(c) As used in this Agreement, "Good Reason" means the occurrence of any of the following: (1) a material breach by the Company of the terms of this Agreement; (2) a material reduction in the Executive's Base Salary; (3) a material diminution in the Executive's authority, duties or responsibilities; or (4) a material change in the geographic location at which the Executive performs services for the Company; provided, however, that the Executive must notify the Company within ninety (90) days of the occurrence of any of the foregoing conditions that he considers it to be a "Good Reason" condition and provide the Company with at least thirty (30) days in which to cure the condition. If the Executive fails to provide this notice and cure period prior to his resignation, or resigns more than six (6) months after the initial existence of the condition, his resignation will not be deemed to be for "Good Reason."

(d) If the Executive's employment is terminated pursuant to Section 4.1(a) other than during the Post-Change in Control Period (as defined in Section 4.1(e)), the Executive shall, in full discharge of all of the Company's obligations to the Executive, be entitled to receive, and the Company's sole obligation to the Executive under this Agreement or otherwise shall be to pay or provide to the Executive, the following:

(i) the Accrued Obligations (as defined in Section 4.2(b));

(ii) six (6) months accelerated vesting of all of the Executive's outstanding stock options, restricted stock and other equity incentive awards; and

(iii) subject to Section 4.4 and Section 4.5:

(A) payments equal to twelve (12) months of the Executive's Base Salary (at the rate in effect immediately prior to the Termination Date) (less applicable withholdings and authorized deductions), to be paid in equal installments bimonthly in accordance with the Company's customary payroll practices, commencing sixty (60) days following the Termination Date (the "Pre-CIC Severance Payments"); and

(B) if the Executive then participates in the Company's medical and/or dental plans and the Executive timely elects to continue and maintain group health plan coverage pursuant to the Consolidated Omnibus Budget Reconciliation Act of 1985, as amended ("COBRA"), the Company will pay monthly, on the Executive's behalf, a portion of the cost of such coverage for the twelve (12) months after the Termination Date, which payments will be equal to the amount of the monthly premium for such coverage, less the amount that the Executive would have been required to pay if the Executive had remained an active employee of the Company (the "Pre-CIC COBRA Assistance"); provided, however, that if and to the extent that the Company may not provide such Pre-CIC COBRA Assistance without incurring tax penalties or violating any requirement of the law, the Company shall use its commercially reasonable best efforts to provide substantially similar assistance in an alternative manner provided that the cost of doing so does not exceed the cost that the Company would have incurred had the Pre-CIC COBRA Assistance been provided in the manner described above or cause a violation of Section 409A (as defined in Section 5.16).

(e) If the Executive's employment is terminated pursuant to Section 4.1(a) during the twenty-four (24) months immediately following a Change in Control (as defined below) (the "Post-Change in Control Period"), the Executive shall, in full discharge of all of the Company's obligations to the Executive (and in lieu of any payments and benefits set forth in Section 4.1(d)), be entitled to receive, and the Company's sole obligation to the Executive under this Agreement or otherwise shall be to pay or provide to the Executive, the following:

(i) the Accrued Obligations;

(ii) full accelerated vesting of all of the Executive's outstanding stock options, restricted stock and other equity incentive awards; and

(iii) subject to Section 4.4 and Section 4.5:

(A) payments equal to eighteen (18) months of the Executive's Base Salary (at the rate in effect immediately prior to the Termination Date) (less applicable withholdings and authorized deductions), to be paid in equal installments bimonthly in accordance with the Company's customary payroll practices, commencing sixty (60) days following the Termination Date (the "Post-CIC Severance Payments");

(B) if the Executive then participates in the Company's medical and/or dental plans and the Executive timely elects to continue and maintain group health plan coverage pursuant to COBRA, the Company will pay monthly, on the Executive's behalf, a portion of the cost of such coverage for the eighteen (18) months after the Termination Date, which payments will be equal to the amount of the monthly premium for such coverage, less the amount that the Executive would have been required to pay if the Executive had remained an active employee of the Company (the "Post-CIC COBRA Assistance"); provided, however, that if and to the extent that the Company may not provide such Post-CIC COBRA Assistance without incurring tax penalties or violating any requirement of the law, the Company shall use its commercially reasonable best efforts to provide substantially similar assistance in an alternative manner provided that the cost of doing so does not exceed the cost that the Company would have incurred had the Post-CIC COBRA Assistance been provided in the manner described above or cause a violation of Section 409A; and

(C) a payment equal to the Executive's Target Annual Bonus for the calendar year in which the Termination Date occurs, payable in a lump sum on the 60th day following the Termination Date.

(f) As used in this Agreement, "Change in Control" means (x) a change in ownership of the Company under clause (i) below or (y) a change in the ownership of a substantial portion of the assets of the Company under clause (ii) below:

(i) Change in the Ownership of the Company. A change in the ownership of the Company shall occur on the date that any one person, or more than one person acting as a group (as defined in clause (iii) below), acquires ownership of capital stock of the Company that, together with capital stock held by such person or group, constitutes more than 50 percent of the total fair market value or total voting power of the capital stock of the Company. However, if any one person or more than one person acting as a group, is considered to own more than 50 percent of the total fair market value or total voting power of the capital stock of the Company, the acquisition of additional capital stock by the same person or persons shall not be considered to be a change in the ownership of the Company. An increase in the percentage of capital stock owned by any one person, or persons acting as a group, as a result of a transaction in which the Company acquires capital stock in the Company in exchange for property will be treated as an acquisition of stock for purposes of this paragraph.

(ii) Change in the Ownership of a Substantial Portion of the Company's Assets. A change in the ownership of a substantial portion of the Company's assets shall occur on the date that any one person, or more than one person acting as a group (as defined in clause (iii) below), acquires (or has acquired during the 12-month period ending on the date of the most recent acquisition by such person or persons) assets from the Company that have a total gross fair market value equal to or more than 80 percent of the total gross fair market value of all of the assets of the Company immediately prior to such acquisition or acquisitions. For this purpose, gross fair market value means the value of the assets of the Company, or the value of the assets being disposed of, determined without regard to any liabilities associated with such assets. There is no Change in Control under this clause (ii) when there is a transfer to an entity that is controlled by the shareholders of the Company immediately after the transfer, as provided below in this clause (ii). A transfer of assets by the Company is not treated as a change in the ownership of such assets if the assets are transferred to (a) a shareholder of the Company (immediately before the asset transfer) in exchange for or with respect to its capital stock, (b) an entity, 50 percent or more of the total value or voting power of which is owned, directly or indirectly, by the Company, (c) a person, or more than one person acting as a group, that owns, directly or indirectly, 50 percent or more of the total value or voting power of all the outstanding capital stock of the Company, or (d) an entity, at least 50 percent of the total value or voting power of which is owned, directly or indirectly, by a person described in clause (ii)(c) of this paragraph. For purposes of this clause (ii), a person's status is determined immediately after the transfer of the assets.

(iii) Persons Acting as a Group. For purposes of clauses (i) and (ii) above, persons will not be considered to be acting as a group solely because they purchase or own capital stock or purchase assets of the Company at the same time. However, persons will be considered to be acting as a group if they are owners of a corporation that enters into a merger, consolidation, purchase or acquisition of assets or capital stock, or similar business transaction with the Company. If a person, including an entity, owns stock in both corporations that enter into a merger, consolidation, purchase or acquisition of assets or capital stock, or similar transaction, such shareholder is considered to be acting as a group with other shareholders in a corporation only with respect to the ownership in that corporation before the transaction giving rise to the change and not with respect to the ownership interest in the other corporation. For purposes of this paragraph, the term "corporation" shall have the meaning assigned such term under Treasury Regulation section 1.280G-1, Q&A-45.

(iv) Each of clauses (i) through (iii) above shall be construed and interpreted consistent with the requirements of Section 409A and any Treasury Regulations or other guidance issued thereunder.

Section 4.2. Termination for Cause: Voluntary Termination.

(a) The Company may terminate the Executive's employment hereunder at any time for Cause upon written notice to the Executive. The Executive may voluntarily terminate his employment hereunder at any time without Good Reason upon ninety (90) days prior written notice to the Company; provided, however, the Company reserves the right, upon written notice to the Executive, to accept the Executive's notice of resignation and to accelerate such notice and make the Executive's resignation effective immediately, or on such other date prior to Executive's intended last day of work as the Company deems appropriate. It is understood and agreed that the Company's election to accelerate Executive's notice of resignation shall not be deemed a termination by the Company without Cause for purposes of Section 4.1 of this Agreement or otherwise or constitute Good Reason (as defined in Section 4.1) for purposes of Section 4.1 of this Agreement or otherwise.

(b) If the Executive's employment is terminated pursuant to Section 4.2(a), the Executive shall, in full discharge of all of the Company's obligations to the Executive, be entitled to receive, and the Company's sole obligation under this Agreement or otherwise shall be to pay or provide to the Executive, the following (collectively, the "Accrued Obligations"):

(i) the Executive's earned, but unpaid, Base Salary through the final date of the Executive's employment by the Company (the "Termination Date"), payable in accordance with the Company's standard payroll practices;

(ii) the Executive's accrued, but unused, vacation (in accordance with the Company's policies);

(iii) expenses reimbursable under Section 3.2 above incurred on or prior to the Termination Date but not yet reimbursed; and

(iv) any amounts or benefits that are vested amounts or vested benefits or that the Executive is otherwise entitled to receive under any plan, program, policy or practice (with the exception of those, if any, relating to severance) on the Termination Date, in accordance with such plan, program, policy, or practice.

Section 4.3. Termination Resulting from Death or Disability.

(a) As the result of any Disability suffered by the Executive, the Company may, upon five (5) days prior notice to the Executive, terminate the Executive's employment under this Agreement. The Executive's employment shall automatically terminate upon his death.

(b) "Disability" means a determination by the Company in accordance with applicable law that as a result of a physical or mental injury or illness, the Executive is unable to perform the essential functions of his job with or without reasonable accommodation for a period of (i) ninety (90) consecutive days; or (ii) one hundred twenty (120) days during any twelve (12) month period.

(c) If the Executive's employment is terminated pursuant to Section 4.3(a), the Executive or the Executive's estate, as the case may be, shall be entitled to receive, and the Company's sole obligation under this Agreement or otherwise shall be to pay or provide to the Executive or the Executive's estate, as the case may be, the Accrued Obligations.

Section 4.4. Release Agreement. In order to receive the Pre-CIC Severance Payments or the Post-CIC Severance Payments (collectively referred to herein as the "Severance Payments") or the Pre-CIC COBRA Assistance or the Post-CIC COBRA Assistance (collectively referred to herein as the "COBRA Assistance") set forth in Section 4.1 (if eligible), the Executive must timely execute (and not revoke) a separation agreement and general release (the "Release Agreement") in a customary form as is determined to be reasonably necessary by the Company in its good faith and reasonable discretion. If the Executive is eligible for Severance Payments and COBRA Assistance pursuant to Section 4.1, the Company will deliver the Release Agreement to the Executive within seven (7) calendar days following the Termination Date. The Severance Payments and COBRA Assistance are subject to the Executive's execution of such Release Agreement within 45 days of the Executive's receipt of the Release Agreement and the Executive's non-revocation of such Release Agreement.

Section 4.5. Post-Termination Breach. Notwithstanding anything to the contrary contained in this Agreement, the Company's obligations to provide the Severance Payments and the COBRA Assistance will immediately cease if the Executive breaches any of the provisions of the Covenants Agreement, the Release Agreement or any other agreement the Executive has with the Company.

Section 4.6. Removal from any Boards and Position. If the Executive's employment is terminated for any reason under this Agreement, he shall be deemed (without further action, deed or notice) to resign (i) if a member, from the Board or board of directors (or

similar governing body) of any Affiliate of the Company or any other board to which he has been appointed or nominated by or on behalf of the Company and (ii) from all other positions with the Company or any subsidiary or other Affiliate of the Company, including, but not limited to, as an officer of the Company and any of its subsidiaries or other Affiliates.

ARTICLE 5
GENERAL PROVISIONS

Section 5.1. Company Non-Disclosure and Invention Assignment Agreement. The Executive acknowledges and confirms that the Non-Disclosure and Invention Assignment Agreement executed by the Executive in favor of the Company as of October 22, 2012 (the "Covenants Agreement"), the terms of which are incorporated herein by reference, remains in full force and effect and binding upon the Executive. The Covenants Agreement shall survive the termination of this Agreement and the Executive's employment by the Company for the applicable period(s) set forth therein.

Section 5.2. Expenses. Each of the Company and the Executive shall bear its/his own costs, fees and expenses in connection with the negotiation, preparation and execution of this Agreement.

Section 5.3. Entire Agreement. This Agreement and the Covenants Agreement contain the entire agreement of the parties hereto with respect to the terms and conditions of the Executive's employment during the Term and activities following termination of this Agreement and the Executive's employment with the Company and supersede any and all prior agreements and understandings, whether written or oral, between the parties hereto with respect to the subject matter of this Agreement or the Covenants Agreement. Each party hereto acknowledges that no representations, inducements, promises or agreements, whether oral or in writing, have been made by any party, or on behalf of any party, which are not embodied herein or in the Covenants Agreement. The Executive acknowledges and agrees that the Company has fully satisfied, and has no further, obligations to the Executive arising under, or relating to, any other employment or consulting arrangement or understanding (including, without limitation, any claims for compensation or benefits of any kind) or otherwise. No agreement, promise or statement not contained in this Agreement or the Covenants Agreement shall be valid and binding, unless agreed to in writing and signed by the parties sought to be bound thereby.

Section 5.4. No Other Contracts. The Executive represents and warrants to the Company that neither the execution and delivery of this Agreement by the Executive nor the performance by the Executive of the Executive's obligations hereunder, shall constitute a default under or a breach of the terms of any other agreement, contract or other arrangement, whether written or oral, to which the Executive is a party or by which the Executive is bound, nor shall the execution and delivery of this Agreement by the Executive nor the performance by the Executive of his duties and obligations hereunder give rise to any claim or charge against either the Executive, the Company or any Affiliate, based upon any other contract or other arrangement, whether written or oral, to which the Executive is a party or by which the Executive is bound. The Executive further represents and warrants to the Company that he is not a party to or subject to any restrictive covenants, legal restrictions or other agreement, contract or arrangement, whether written or oral, in favor of any entity or person which would in any way preclude, inhibit, impair or limit the Executive's ability to perform his obligations under this Agreement, including, but not limited to, non-competition agreements, non-solicitation agreements or confidentiality agreements. The Executive shall defend, indemnify and hold the Company harmless from and against all claims, actions, losses, liabilities, damages, costs and expenses (including reasonable attorney's fees and amounts paid in settlement in good faith) arising from or relating to any breach of the representations and warranties made by the Executive in this Section 5.4.

Section 5.5. Notices. Any notice or other communication required or permitted hereunder shall be in writing and shall be delivered personally or sent by nationally recognized overnight courier service (with next business day delivery requested). Any such notice or communication shall be deemed given and effective, in the case of personal delivery, upon receipt by the other party, and in the case of a courier service, upon the next business day, after dispatch of the notice or communication. Any such notice or communication shall be addressed as follows:

If to the Company, to:

Matinas BioPharma Holdings, Inc.
1545 Route 206, 3rd Floor Suite 302
Bedminster, New Jersey 07921

Attn: Board of Directors

With a copy to:

Lowenstein Sandler LLP
1251 Avenue of the Americas
New York, New York 10020
Attn: Michael J. Lerner, Esq.

If to the Executive, to:

Roelof Rongen
131 Fairmont Road East
Califon, NJ 07830

Any person named above may designate another address or fax number by giving notice in accordance with this Section to the other persons named above.

Section 5.6. Governing Law; Jurisdiction. This Agreement shall be governed by, and construed in accordance with, the laws of the State of New Jersey, without regard to principles of conflicts of law. Any and all actions arising out of this Agreement or Employee's employment by Company or termination therefrom shall be brought and heard in the state and federal courts of the State of New Jersey and the parties hereto hereby irrevocably submit to the exclusive jurisdiction of any such courts. THE COMPANY AND THE EXECUTIVE HEREBY WAIVE THEIR RESPECTIVE RIGHT TO TRIAL BY JURY IN ANY ACTION CONCERNING THIS AGREEMENT OR ANY AND ALL MATTERS ARISING DIRECTLY OR INDIRECTLY HEREFROM AND REPRESENT THAT THEY HAVE CONSULTED WITH COUNSEL OF THEIR CHOICE OR HAVE CHOSEN VOLUNTARILY NOT TO DO SO SPECIFICALLY WITH RESPECT TO THIS WAIVER.

Section 5.7. Waiver. Either party hereto may waive compliance by the other party with any provision of this Agreement. The failure of a party to insist on strict adherence to any term of this Agreement on any occasion shall not be considered a waiver or deprive that party of the right thereafter to insist upon strict adherence to that term or any other term of this Agreement. No waiver of any provision shall be construed as a waiver of any other provision. Any waiver must be in writing.

Section 5.8. Severability. If any one or more of the terms, provisions, covenants and restrictions of this Agreement shall be determined by a court of competent jurisdiction to be invalid, void or unenforceable, the remainder of the terms, provisions, covenants and restrictions of this Agreement shall remain in full force and effect and shall in no way be affected, impaired or invalidated and the parties will attempt to agree upon a valid and enforceable provision which shall be a reasonable substitute for such invalid and unenforceable provision in light of the tenor of this Agreement, and, upon so agreeing, shall incorporate such substitute provision in this Agreement. In addition, if any one or more of the provisions contained in this Agreement shall for any reason be determined by a court of competent jurisdiction to be excessively broad as to duration, geographical scope, activity or subject, it shall be construed, by limiting or reducing it, so as to be enforceable to the extent compatible with then applicable law.

Section 5.9. Counterparts. This Agreement may be executed in any number of counterparts and each such duplicate counterpart shall constitute an original, any one of which may be introduced in evidence or used for any other purpose without the production of its duplicate counterpart. Moreover, notwithstanding that any of the parties did not execute the same counterpart, each counterpart shall be deemed for all purposes to be an original, and all such counterparts shall constitute one and the same instrument, binding on all of the parties hereto.

Section 5.10. Advice of Counsel. This Agreement was prepared by Lowenstein Sandler LLP in its capacity as legal counsel to the Company. Both parties hereto acknowledge that they have had the opportunity to seek and obtain the advice of counsel before entering into this Agreement and have done so to the extent desired, and have fully read the Agreement and understand the meaning and import of all the terms hereof.

Section 5.11. Assignment. This Agreement shall inure to the benefit of the Company and its successors and assigns (including, without limitation, the purchaser of all or substantially all of its assets) and shall be binding upon the Company and its successors and assigns. This Agreement is personal to the Executive, and the Executive shall not assign or delegate his rights or duties under this Agreement, and any such assignment or delegation shall be null and void.

Section 5.12. Agreement to Take Actions. Each party to this Agreement shall execute and deliver such documents, certificates, agreements and other instruments, and shall take all other actions, as may be reasonably necessary or desirable in order to perform his or its obligations under this Agreement.

Section 5.13. No Attachment. Except as required by law, no right to receive payments under this Agreement shall be subject to anticipation, commutation, alienation, sale, assignment, encumbrance, charge, pledge, or hypothecation or to execution, attachment, levy or similar process or assignment by operation of law, and any attempt, voluntary or involuntary, to effect any such action shall be null, void and of no effect; provided, however, that nothing in this Section 5.13 shall preclude the assumption of such rights by executors, administrators or other legal representatives of the Executive or the Executive's estate and their assigning any rights hereunder to the person or persons entitled thereto.

Section 5.14. Source of Payment. Except as otherwise provided under the terms of any applicable employee benefit plan, all payments provided for under this Agreement shall be paid in cash from the general funds of Company. The Company shall not be required to establish a special or separate fund or other segregation of assets to assure such payments, and, if the Company shall make any investments to aid it in meeting its obligations hereunder, the Executive shall have no right, title or interest whatever in or to any such investments except as may otherwise be expressly provided in a separate written instrument relating to such investments. Nothing contained in this Agreement, and no action taken pursuant to its provisions, shall create or be construed to create a trust of any kind, or a fiduciary relationship, between Company and the Executive or any other person. To the extent that any person acquires a right to receive payments from Company hereunder, such right, without prejudice to rights which employees may have, shall be no greater than the right of an unsecured creditor of Company. The Executive shall not look to the owners of the Company for the satisfaction of any obligations of the Company under this Agreement.

Section 5.15. Tax Withholding. The Company or other payor is authorized to withhold from any benefit provided or payment due hereunder, the amount of withholding taxes due any federal, state or local authority in respect of such benefit or payment and to take such other action as may be necessary in the opinion of the Board to satisfy all obligations for the payment of such withholding taxes. The Executive will be solely responsible for all taxes assessed against him with respect to the compensation and benefits described in this Agreement, other than typical employer-paid taxes such as FICA, and the Company makes no representations as to the tax treatment of such compensation and benefits.

Section 5.16. 409A Compliance. All payments under this Agreement are intended to comply with or be exempt from the requirements of Section 409A of the Code and regulations promulgated thereunder ("Section 409A"). As used in this Agreement, the "Code" means the Internal Revenue Code of 1986, as amended. To the extent permitted under applicable regulations and/or other guidance of general applicability issued pursuant to Section 409A, the Company reserves the right to modify this Agreement to conform with any or all relevant provisions regarding compensation and/or benefits so that such compensation and benefits are exempt from the provisions of 409A and/or otherwise comply with such provisions so as to avoid the tax consequences set forth in Section 409A and to assure that no payment or benefit shall be subject to an "additional tax" under Section 409A. To the extent that any provision in this Agreement is ambiguous as to its compliance with Section 409A, or to the extent any provision in this Agreement must be modified to comply with Section 409A, such provision shall be read in such a manner so that no payment due to the Executive shall be subject to an "additional tax" within the meaning of Section 409A(a)(1)(B) of the Code. If necessary to comply with the restriction in Section 409A(a)(2)(B) of the Code concerning payments to "specified employees," any payment on account of the Executive's separation from service that would otherwise be due hereunder within six (6) months after such separation shall be delayed until the first business day of the seventh month following the Termination Date and the first such payment shall include the cumulative amount of any payments (without interest) that would have been paid prior to such date if not for such restriction. Each payment in a series of payments hereunder shall be deemed to be a separate payment for purposes of Section 409A. In no event may the Executive, directly or indirectly, designate the calendar year of payment. All reimbursements provided under this Agreement shall be made or provided in accordance with the requirements of Section 409A, including, where applicable, the requirement that (i) any reimbursement is for expenses incurred during the Executive's lifetime (or during a shorter period of time specified in this Agreement), (ii) the amount of expenses eligible for reimbursement during a calendar year may not affect the expenses eligible for reimbursement in any other calendar year, (iii) the reimbursement of an eligible expense will be made on or before the last day of the calendar year following the year in which the expense is incurred, and (iv) the right to reimbursement is not subject to liquidation or exchange for another benefit. Notwithstanding anything contained herein to the contrary, the Executive shall not be considered to have terminated employment with the Company for purposes of Section 4.1 unless the Executive would be considered to have incurred a "termination of employment" from the Company within the meaning of Treasury Regulation §1.409A-1(h)(1)(ii). In no event whatsoever shall the Company be liable for any additional tax, interest or penalty that may be imposed on the Executive by Section 409A or damages for failing to comply with Section 409A.

Section 5.17. 280G Modified Cutback.

(a) If any payment, benefit or distribution of any type to or for the benefit of the Executive, whether paid or payable, provided or to be provided, or distributed or distributable pursuant to the terms of this Agreement or otherwise (collectively, the "Parachute Payments") would subject the Executive to the excise tax imposed under Section 4999 of the Code (the "Excise Tax"), the Parachute Payments shall be reduced so that the maximum amount of the Parachute Payments (after reduction) shall be one dollar (\$1.00) less than the amount which would cause the Parachute Payments to be subject to the Excise Tax; provided that the Parachute Payments shall only be reduced to the extent the after-tax value of amounts received by the Executive after application of the above reduction would exceed the after-tax value of the amounts received without application of such reduction. For this purpose, the after-tax value of an amount shall be determined taking into account all federal, state, and local income, employment and excise taxes applicable to such amount. Unless the Executive shall have given prior written notice to the Company to effectuate a reduction in the Parachute Payments if such a reduction is required, which notice shall be consistent with the requirements of Section 409A to avoid the imputation of any tax, penalty or interest thereunder, then the Company shall reduce or eliminate the Parachute Payments by first reducing or eliminating accelerated vesting of stock options or similar awards, then reducing or eliminating any cash payments (with the payments to be made furthest in the future being reduced first), then by reducing or eliminating any other remaining Parachute Payments; provided, that no such reduction or elimination shall apply to any non-qualified deferred compensation amounts (within the meaning of Section 409A) to the extent such reduction or elimination would accelerate or defer the timing of such payment in manner that does not comply with Section 409A.

(b) An initial determination as to whether (x) any of the Parachute Payments received by the Executive in connection with the occurrence of a change in the ownership or control of the Company or in the ownership of a substantial portion of the assets of the Company shall be subject to the Excise Tax, and (y) the amount of any reduction, if any, that may be required pursuant to the previous paragraph, shall be made by an independent accounting firm selected by the Company (the “Accounting Firm”) prior to the consummation of such change in the ownership or effective control of the Company or in the ownership of a substantial portion of the assets of the Company. The Executive shall be furnished with notice of all determinations made as to the Excise Tax payable with respect to the Executive’s Parachute Payments, together with the related calculations of the Accounting Firm, promptly after such determinations and calculations have been received by the Company.

(c) For purposes of this Section 5.17, (i) no portion of the Parachute Payments the receipt or enjoyment of which the Executive shall have effectively waived in writing prior to the date of payment of the Parachute Payments shall be taken into account; (ii) no portion of the Parachute Payments shall be taken into account which in the opinion of the Accounting Firm does not constitute a “parachute payment” within the meaning of Section 280G(b)(2) of the Code; (iii) the Parachute Payments shall be reduced only to the extent necessary so that the Parachute Payments (other than those referred to in the immediately preceding clause (i) or (ii)) in their entirety constitute reasonable compensation for services actually rendered within the meaning of Section 280G(b)(4) of the Code or are otherwise not subject to disallowance as deductions, in the opinion of the auditor or tax counsel referred to in such clause (ii); and (iv) the value of any non-cash benefit or any deferred payment or benefit included in the Parachute Payments shall be determined by the Company’s independent auditors based on Sections 280G and 4999 of the Code and the regulations for applying those sections of the Code, or on substantial authority within the meaning of Section 6662 of the Code.

Mr. Abdel Fawzy March 22, 2017 employment letter

March 22, 2017
Abdel A. Fawzy, PhD
Page 1 of 5

Dr. Abdel A. Fawzy, PhD
1225 Colony Preserve Drive
Boynton Beach, FL 33436

Re: Terms of Employment

Dear Abdel:

The specifics of your terms of employment with Matinas BioPharma Holdings, Inc. (hereinafter referred to as "Matinas" or the "Company") are outlined below:

This letter confirms your continued employment with the Company on an "at will basis," subject to the terms of this letter and supersedes the terms of your employment agreement dated July 30, 2013.

Title: Reporting; Policies; Time.

You shall serve in the capacity of Executive Vice President, Pharmaceutical Development and Supply Chain Development. You shall perform such duties and services as are assigned to you by the Company. You shall report directly to the Chief Executive Officer. You acknowledge that your employment will be subject to all policies and practices of the Company as may currently exist or as may be curtailed, modified or implemented from time to time. Further, you shall devote your full time and attention to the affairs of the Company and to your duties therein.

Location.

Your principal place of business for the performance of your duties under this Agreement shall be at the principal executive office of the Company. Notwithstanding the foregoing, you shall be required to travel as necessary to perform your duties hereunder.

Base Salary:

Beginning March 1, 2017, your base salary shall be at an annualized rate of \$255,000 per year, which shall be subject to customary withholdings and authorized deductions and be payable in equal installments in accordance with the Company's customary payroll practices in place from time to time.

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2016 Bonus:

As a result of your continued employment with the Company and your performance during the 2016 calendar year, you will receive a \$70,000 bonus payable in a lump sum by March 15, 2017.

Annual Incentive (Bonus):

For each calendar year ending during your employment with the Company you shall be eligible to receive an annual bonus (the "Annual Bonus") with a target amount equal to thirty percent (30%) of your Base Salary earned by you for such calendar year (the "Target Annual Bonus") which may be awarded (or not awarded) in the discretion of the Company's Board of Directors (the "Board"). The actual amount of each Annual Bonus, if any, will be based upon the level of achievement of the Company's corporate objectives and your individual objectives, in each case, as established by the Board or the Compensation Committee (taking into account the input of the Chief Executive Officer with respect to the establishment of the your individual objectives) for the calendar year with respect to which such Annual Bonus relates. The determination of the level of achievement of the corporate objectives and your individual performance objectives for a year shall be made by the Board or the Compensation Committee (taking into account the input of the Chief Executive Officer with respect to the level of achievement of your individual objectives), in its reasonable discretion. Each Annual Bonus for a calendar year, to the extent earned and awarded, will be paid in a lump sum in the following calendar year, within the first 75 days of such following year. The Annual Bonus shall not be deemed earned until the date that it is paid. Accordingly, in order for you to receive an Annual Bonus, you must be actively employed by the Company at the time of such payment.

Equity Compensation

On February 21, 2017, the Compensation Committee approved a grant to you of options to purchase up to 125,000 shares of the Company's common stock pursuant to the Company's 2013 Equity Compensation Plan, as amended and restated (the "2013 Plan"), on the terms and conditions determined by the Compensation Committee and as shall be set forth in a separate Option Award Agreement to be entered into between you and the Company. Further, during your employment with the Company, subject to the terms and conditions established within the 2013 Plan or any successor equity compensation plan as may be in place from time to time and separate Award Agreements (as defined in the 2013 Plan), you also may be eligible to receive from time to time additional Stock Options, Stock Unit Awards, Performance Shares, Performance Units, Incentive Bonus Awards, Other Cash-Based Awards and/or Other Stock-Based Awards (as such capitalized terms are defined in the 2013 Plan), in amounts, if any, to be approved by the Board or the Compensation Committee in its discretion.

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Benefits:

You shall be entitled to participate in all employee benefit plans and programs (excluding severance plans, if any) generally made available by the Company to senior executives of the Company, to the extent permissible under the general terms and provisions of such plans or programs and in accordance with the provisions thereof. The Company may amend, modify or rescind any employee benefit plan or program and/or change employee contribution amounts to benefit costs without notice in its discretion.

Paid Vacation:

You shall be entitled to paid vacation days in accordance with the Company's vacation policies in effect from time to time for its executive team.

Employment At Will:

In countersigning this letter you acknowledge that you understand and agree that your employment with the Company is "at will." As such, you agree that either you or Matinas may end the employment relationship at any time, with or without notice and with or without cause.

Notwithstanding the foregoing, in the event the Company terminates your employment without Cause (as defined in the 2013 Plan), it shall provide you with written notice and upon such termination, you will be entitled to payments equal to eight (8) months of your then-current base salary as severance plus continuation of medical benefits during these eight months or payment thereof. Such severance will be payable in equal installments bi-monthly accordance with the Company's regular payroll practices, commencing on the first regular payroll date on or following the 60th day after the date of termination of your employment, subject to your execution, delivery and non revocation, and the effectiveness by such time of a general release in a customary form as is determined to be reasonably necessary by the Company in its good faith and reasonable discretion. Notwithstanding the foregoing, if you breach the Company's Nondisclosure and Invention Assignment Agreement, the Company's obligations to provide the severance payments will immediately cease.

Other Conditions and Obligations:

You acknowledge that you are not subject to any contractual or other binding obligations pursuant to which your employment or employment activities with or on behalf of the Company may be subject to any restrictions. Restrictions include, without limitation, any agreements or other obligations or documents relating to non-competition, confidentiality, trade secrets, proprietary information or works for hire.

Section 409A. This letter is intended to comply with the requirements of Section 409A of the Internal Revenue Code of 1986, as amended (the "Code") and regulations promulgated thereunder ("Section 409A"). To the extent that any provision in this letter is ambiguous as to its compliance with Section 409A, the provision shall be read in such a manner so that no payments due under this letter shall be subject to an "additional tax" as defined in Section 409A(a)(1)(B) of the Code. For purposes of Section 409A, each payment made under this letter shall be treated as a separate payment. In no event may you, directly or indirectly, designate the calendar year of payment. You acknowledge that, while the parties endeavor to have this letter comply with the requirements of Section 409A, any tax liability incurred by you under Section 409A is solely your responsibility.

Governing Law: This letter shall be governed by and construed in accordance with the laws of the State of New Jersey, without regard to principles of conflicts of laws.

Integrated Agreement:

This letter, together with your Nondisclosure and Invention Assignment Agreement, represents the sole and complete understanding between you and the Company relating to the terms of your employment and there are no other written or oral agreements, understandings or representations relating to the terms of your employment. The terms of your employment, including the at-will nature of the employment, may be amended only through a written instrument signed by you and the Company.

By signing and returning this letter, you confirm that this letter accurately sets forth the current understanding between you and the Company and that you accept and agree to the terms as outlined.

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Subsidiaries of Matinas BioPharma Holdings, Inc.

<u>Name</u>	<u>State of Incorporation</u>
Matinas BioPharma, Inc.	Delaware
Matinas BioPharma Nanotechnologies, Inc.	Delaware

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in the Registration Statements of Matinas BioPharma Holdings, Inc. and Subsidiaries on Form S-8 (No(s). 333-198488, 333-203141, 333-210495 and 333-215456) of our report dated March 31, 2017, on our audits of the consolidated financial statements as of December 31, 2016 and 2015 and for each of the years in the two-year period ended December 31, 2016, which report is included in this Annual Report on Form 10-K to be filed on or about March 31, 2017.

/s/ EISNERAMPER LLP

Iselin, New Jersey
March 31, 2017

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER

I, Roelof Rongen, certify that:

1. I have reviewed this annual report on Form 10-K for the year ended December 31, 2016 of Matinas BioPharma Holdings, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 31, 2017

/s/ Roelof Rongen
Roelof Rongen
Chief Executive Officer
(Principal Executive Officer)

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER

I, Gary Gaglione, certify that:

1. I have reviewed this annual report on Form 10-K for the year ended December 31, 2016 of Matinas BioPharma Holdings, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 31, 2017

/s/ Gary Gaglione

Gary Gaglione
Acting Chief Financial Officer
(Principal Financial and Accounting Officer)

**CERTIFICATION OF
THE PRINCIPAL EXECUTIVE OFFICER AND PRINCIPAL FINANCIAL OFFICER
PURSUANT TO RULE 13a-14(b)
OF THE SECURITIES EXCHANGE ACT OF 1934 AND 18 U.S.C. SECTION 1350**

In connection with the Annual Report on Form 10-K of Matinas BioPharma Holdings, Inc. (the "Company") for the fiscal year ended December 31, 2016 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned, Roelof Rongen, Chief Executive Officer of the Company, and Gary Gaglione, Acting Chief Financial Officer of the Company, hereby certify, to the knowledge of the undersigned, 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.

Date: March 31, 2017

/s/ Roelof Rongen
Roelof Rongen
Chief Executive Officer
(Principal Executive Officer)

Date: March 31, 2017

/s/ Gary Gaglione
Gary Gaglione
Acting Chief Financial Officer
(Principal Financial and Accounting Officer)

This Certification is being furnished solely to accompany the Report pursuant to 18 U.S.C. § 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, and shall not be deemed "filed" by the Company for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, and shall not be incorporated by reference into any filing of the Company under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date of this Report, irrespective of any general incorporation language contained in such filing.

A signed original of this written statement required by Section 906 of the Sarbanes-Oxley Act of 2002 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.
